

EVALUATING THE EFFECTS OF PROJECT DARE
IN RURAL SOUTHEAST MINNESOTA SCHOOLS

A Dissertation
Presented to
the School of Education
Drake University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

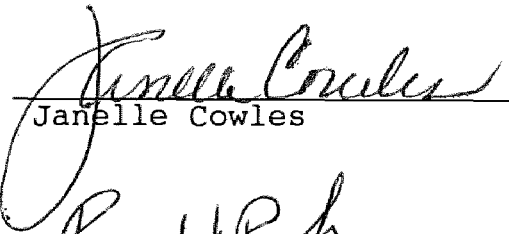
by David D. Thompson
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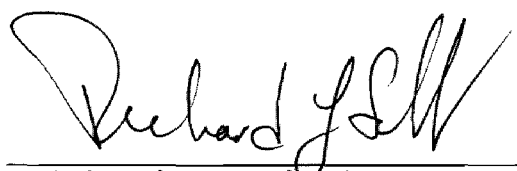
September 1993

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EVALUATING THE EFFECTS OF PROJECT DARE
IN RURAL SOUTHEAST MINNESOTA SCHOOLS

An Abstract of a Dissertation by
David D. Thompson
September 1993
Drake University
Advisor: Janelle Cowles

The Problem. The purpose of this study is to determine whether differences exist in knowledge and attitude toward chemical substances and use between groups receiving instruction with the Drug Abuse Resistance Education (DARE) program and no specific drug education program. The study also investigates the effect of gender and pretesting.

Procedures. A sample of over 500 students from eight rural Minnesota schools were included in the study. The students were administered a 36-item knowledge assessment to measure knowledge related to drugs, and a 74-item attitude survey used to measure drug knowledge, self-esteem, and attitude toward chemical usage, police, resistance, and drugs. The data were collected using a Solomon four group design and analyzed using the three-way Analysis of Variance. The alpha-level was .05. T-tests were used to determine differences for the DARE group that participated in the pretest and posttest administrations.

Findings. The DARE students scored statistically significantly higher on the knowledge assessment. In both the DARE and non-DARE groups, girls scored significantly higher than boys. The results of the attitude survey revealed that students instructed in the DARE program experienced statistically significantly higher scores for self-esteem and drug knowledge scales. The attitude toward police scale was the only scale in which pretesting had a statistically significant effect. In the group of DARE students who took both the pretest and posttest, it was found that statistically significant differences existed for the knowledge assessment and for all of the scales of the attitude survey.

Conclusions. The evidence presented in this study indicated gains in drug knowledge assessment, as well as drug knowledge, self-esteem, and attitude toward drugs scales from the attitude survey, can be attributed to the scope and sequence of the DARE program. In this study, the results were mixed as to whether the DARE program improves resistance and attitude toward police.

Recommendations. Based on statistically significant results from the knowledge assessment and attitude survey, it is recommended that the Project DARE program should be implemented into a school's comprehensive drug prevention education program. It is recommended that the curriculum and instruction be reevaluated and modified with additional student instructional time being devoted to resistance training. A longitudinal study is recommended for DARE students during their high school years.

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Chapter 1

INTRODUCTION

Background of the Problem

Few social issues, if any, have so occupied center stage in contemporary U.S.A. as the alcohol and substance abuse problems of adolescents (Beamer, 1991; LaChance, 1989; Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990). Substance abuse can affect adolescent students of all social, economic, and geographic regions. All adolescents are at risk of the psychological and physiological ravages of substance abuse (Donovan & Jessor, 1983; Ellickson & Bell, 1990; Hawkins, Lishner, & Catalano, 1985a; Minnesota Department of Public Safety, 1990).

A review of the literature shows that the United States is estimated to have the highest levels of illicit drug involvement found in any developed country in the world (Johnston, O'Malley, & Bachman, 1985; LaChance, 1989). Research shows that drug use among children is 10 times more prevalent than parents suspect (U.S. Department of Education, 1986; U.S. Department of Health and Human Services [USDHHS], 1991d). The percentage of students using drugs by the sixth grade has tripled from 1979 to 1989 (National Commission on Drug-Free Schools, 1990). Now one

in six 13-year olds has used marijuana and nearly two-thirds of all American youth try an illicit drug before they finish high school (Blau, Gillespie, Felner, & Evan, 1988; Collabollleta, Bratter, & Fossbender, 1983; Johnston et al., 1985; Leatt, 1989).

An investigation by Donovan and Jessor (1983) indicated that by the seventh grade, 5% of both females and males were already problem drinkers. This proportion increased steadily in each grade until by grade 12, 20.6% of females and 40% of males had problems with alcohol consumption (Johnston & O'Malley, 1985). Other research confirms that the age of beginning drinking has lowered in recent years (Bachman, Johnston, & O'Malley, 1981; Boltan, 1988; USDHHS, 1991b). The figures placed the average age for beginning consumption of alcohol in the United States at 12.5 years (McCurdy, 1986). In a poll of more than 380,000 students, 16% (61,000) said they tried their first beer before age 10 (National Commission on Drug-Free Schools, 1990).

Although prevalence of use of some substances may be down, the intensity of use may be going up (Berdiansky, 1991; Botvin, 1986; McCurdy, 1986). Today's substances are more potent and addictive than ever before. For example, marijuana today can be 5 to 20 times stronger than it was previously (Towers, 1987b). Crack, a new and highly addictive form of cocaine, and the so-called new "designer

drugs" have been known to cause permanent brain damage (USDHHS, 1990a). Increases of use are also being seen in the use of inhalants and PCP (Phencyclidine) among high school students (Bachman, O'Malley, & Johnston, 1984; National Commission on Drug-Free Schools, 1990). In fact, daily use of inhalants has become more prevalent than ever before (Johnston & O'Malley, 1985; McCurdy, 1986; Minnesota Department of Public Safety, 1990; Minnesota Police and Peace Officers Association, 1990).

In Minnesota, St. Paul police Sgt. Darryl Schmidt reported that inhalants such as "white out" liquid paper and shoe polish are becoming the preferred drug of choice among middle-school aged students in the Twin Cities area (McGee, 1988).

Problems and Solutions

Over the past two decades, increased public concern about substance abuse in the United States has stimulated a major effort on the part of educators, researchers, policy makers, and concerned citizens to find effective strategies to deter the use of illicit drugs, including alcohol, among youth (DeJong, 1987; Ficklen, 1990; Jessor, 1982; Johnston, O'Malley, & Bachman, 1989; USDHHS, 1991c). As a result, a wide variety of substance abuse prevention programs for youth have evolved which differ in orientation, scope,

methods, and purpose (Fredisdorf, 1989; LaChance, 1989; U.S. Department of Education, 1986; USDHHS, 1991e).

The negative effects of substance abuse on the ability to learn and the contributions of various disruptions in the school environment provide a strong impetus for the schools to find effective solutions to substance use among youth (Anderson & Nash, 1987; Botvin, 1985; Fredisdorf, 1989; Pellow & Jengeleski, 1991; Towers, 1987b). The passage of Public Law 99-570, The Comprehensive Drug Abuse Prevention, Treatment, and Rehabilitation Act of 1986, has renewed the mandate and increased the funding to communities, prevention agencies, and the public schools to deal with substance abuse by young people. Schools can play a major role in the solution of student substance use by becoming involved in early prevention programming (Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990; Sarvela, 1988). Successful prevention demands early attention to a combination of affective, attitudinal, and behavioral components in addition to disseminating accurate information (Ellickson & Bell, 1990; Green, 1987; Horan, Kerns, & Olson, 1988; Kim, McLoed, & Shantzis, 1990; Towers, 1987b; USDHHS, 1984).

Rationale for the Study

The high proportion of young people who use and abuse alcohol and other drugs is one of the most serious concerns

facing our nation today (National Commission on Drug-Free Schools, 1990; Pentz et al., 1989; Newcomb & Bentler, 1986; Towers, 1987a). The abuse of these substances puts young people at risk for serious health, social, and academic consequences. In 1986, not only the Secretary of Education but also the public in general named drug abuse the most serious problem facing public schools (Bennett, 1986; Minnesota Governor's Select Committee, 1989; U.S. Department of Education, 1986).

During the past 10 years, there has been a marked change in the direction of substance abuse education. Traditionally, health education consisted of providing students with knowledge concerning positive and negative health behaviors (Battjes, 1985; Braucht & Braucht, 1984). However, researchers have recently suggested that teaching students only about the extreme negative consequences of substance abuse in a reactive after a substance problem type of instruction is of marginal value (Botvin, 1985; Gonzales, 1989; Johnston et al., 1989; Tobler, 1987).

A review of the literature reveals several common components that seem to form the basis of a successful drug prevention program. The two areas addressed most frequently are developing appropriate social skills and nurturing self-esteem (Bradley, 1988; Green & Kelly, 1989; Leatt, 1989;

McCurdy, 1986; McGee, 1988; Towers, 1987a; U.S. Department of Education, 1986).

Efforts to discourage experimentation and use of substances, including alcohol, tobacco, and chemicals must be proactive and occur before a problem develops and must focus on providing adolescents with social skills training so that they can successfully resist peer pressure and media influences (DeJong, 1987; Johnston et al., 1989; Miller, 1988; National Commission on Drug-Free Schools, 1990). Such training typically involves behavior modeling, role-playing, and extended practice, culminating in a public commitment not to use alcohol, tobacco, or other substances. Teaching students how to refuse offers of such substances is insufficient; they must also be motivated to apply those skills (Boltan, 1988; Clayton, Cattarello, & Walden, 1991; USDHHS, 1990b). To create that motivation, they must be given accurate information about the immediate and long-term consequences of substance abuse (Jones & Battjes, 1985; Kandel & Yamaguchi, 1985; Resnick, 1988; USDHHS, 1989, 1990b).

Statement of the Problem

The topic of substance abuse has been of high interest and concern to parents, educators, policy makers, and government officials. The recent national media attention to the topic of chemical prevention education by Presidents

Reagan and Bush have rekindled the interest in teaching chemical prevention programs in elementary and secondary schools throughout the country.

Few prevention programs have been carefully evaluated by school districts or independent researchers (Hawkins & Nederhood, 1987; Kim et al., 1990). Health educators, principals, superintendents, and school boards have been approached by a large number of vendors promoting substance abuse programs claiming to help students, parents, and educational staff combat student substance abuse. One such program about which the Stewartville Public School Administration and Board was approached was the Project DARE (Drug Abuse Resistance Education) chemical substance prevention program.

Project DARE is a substance abuse prevention program designed to educate upper elementary school children about how to resist peer pressure to experiment with alcohol, tobacco, and other substances. This program, supported and instructed by the local Olmsted County Police Department, gives special attention to fifth and sixth graders to help prepare students for entry into junior high school. A review of the literature shows that this is the age where students are most likely to encounter their first pressure to use alcohol, tobacco, and other chemical substances (Battjes, 1985; Blau et al., 1988; Gonzales, 1989; Jensen,

1992; National Commission on Drug-Free Schools, 1990; U.S. Department of Education, 1986).

To determine the intended results of the Project DARE program, the following questions need to be asked:

1. Does the teaching of the Project DARE program improve students' test scores on a criterion referenced chemical abstinence/abuse knowledge assessment?
2. Does the teaching of the Project DARE program improve students' attitudes towards abstinence from chemical substances?

Purpose of the Study

The purpose of this study was to determine if the DARE program was a primary preventative program approach to substance use that had immediate, positive effects on upper elementary students' attitudes and knowledge. The study relied on an outcome-based type of research and only the Project DARE program was evaluated. The study will be used to gain valuable information of the knowledge and attitude related to students from rural Midwestern, two-parent, white, middle-class backfround. From the information gained from this study, the stakeholders of Project DARE program can determine if this program is worth the time, effort, and resources involved in teaching the program and/or implementing the program into the school's curriculum.

Expected Results

It was expected that the group of students involved in the Project DARE program would show significant increases in the chemical knowledge assessment scores and attitude surveys because of participation in the Project DARE program.

It was expected that the group receiving the Project DARE program instruction would show improvement in the chemical knowledge assessment and attitude survey scores at a significantly higher level than the control group because of participation in the Project DARE program.

Significance of the Study

Americans turn to schools for educational solutions whenever significant problems which affect large segments of school-aged students exist (Bry, 1983; Fredisdorf, 1989; LaChance, 1989; USDHHS, 1991e). Educational efforts and programs evolve to meet the areas of societal concerns. There is often a deep and abiding faith that some educational efforts are better than no efforts (Berdiansky, Brownlee & Ajuba, 1988; Dade County Public Schools, 1989; Durell & Bukoski, 1984; Morehouse, 1979).

The Project DARE program attempts to address a major local, regional, and national concern, of providing the nation's young people with the skills necessary to resist

peer pressure to experiment and use tobacco, alcohol, or other chemical substances.

There is also a definite need for this type of substance abuse programming at this specific age level. Researchers have provided us with information attesting to the fact that information and programs concerning substance abuse should be initiated in the elementary schools (DeJong, 1987; Fredisdorf, 1989; Johnston, et al., 1989; LaChance, 1989; Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990; National Institute of Alcohol Abuse and Alcoholism, 1983; Towers, 1987b; U.S. Department of Education, 1986).

The DARE program was also chosen for this study because it allowed the interaction and cooperation between students, parents, schools, police departments, and local government agencies. There are many positive benefits to be found in this partnership that may enhance the school, community, and county.

The results of this study will help fill a void of evaluative data due to lack of previous program evaluation documentation in rural Minnesota schools. The study will help indicate to students, parents, teachers, administrators, school boards, and police departments if the Project DARE program is a viable program to use in an upper elementary chemical prevention curriculum. This study may

also give an indication if the various agencies can work successfully together to ensure student success for future programming.

Definition of Terms

The following definitions that apply to this study have been obtained from the DARE program Instructors Resource Manual unless otherwise designated.

1. Abuse. The wrong use of something such as the misuse of drugs.
2. Consequences. The results of something you do or choose not to do.
3. Decision. The act of making up one's mind.
4. Drug. Any substance other than a food that can affect the way your mind and body work.
5. Media. Any means of communication that reaches or influences large number of people: television, radio, newspaper, magazine, and billboards.
6. Peer Pressure. A force or influence that acts on a person to do something by people who are the same age.
7. Primary Prevention Program. Primary prevention begins before drug use has occurred and includes the education and information programs thought of as defined by prevention. A primary prevention program maximizes the total personal development of children, thereby offsetting some of the factors that incline them toward deviant

behavior. These programs include some or all of the following: self-concept building, values clarification, respect for self and others, taking responsibility for actions, decision making, understanding peer influences, and the nature of drugs.

8. Prevention Programs. Prevention programs aim at the reduction, delay, or prevention of drug use before drug use has become habitual or clearly dysfunctional.

9. Resistance. Resistance is to oppose or stand against a force or pressure; to say no.

10. Self-esteem. This is a favorable way a person feels about himself or herself.

11. Stress. Any strain, pressure, or excitement felt about a situation or event.

12. Support System. A group of people working together to help one another.

13. Project DARE. Is an acronym that stands for Drug Abuse Resistance Education and is the independent variable for the study. It is a substance-abuse prevention program designed to equip upper elementary school children with skills for resisting peer pressure to experiment with alcohol, tobacco, and other substances.

Delimitations

The following are the delimitations for this study:

1. The race of students was not considered

2. There was no attempt to ascertain the relationships between socioeconomic status and achievement of the students in this study
3. Teacher effect was not considered
4. Years of teaching experience were not considered

Assumptions

The following assumptions were made in this study:

1. The police officer trained and certified as a Project DARE program instructor was a competent instructor
2. Students can read and understand the criterion referenced chemical substance knowledge assessment and attitudinal survey
3. Students were given ample and similar time as found to be appropriate from previous pilot tests to be able to complete the test to the best of their abilities

Null Hypotheses

The investigator used the following null hypotheses for the study:

1. There is no statistically significant difference between the Project DARE treatment and non-treatment posttest knowledge scores when

differences in pretest knowledge scores are statistically controlled for.

2. There is no statistically significant difference between the Project DARE treatment and non-treatment posttest attitude scores when differences in pretest attitude scores are statistically controlled for.

Summary

It is evident that there is a distinct need to deal with factors leading to substance abuse starting at the elementary school level (Bell & Battjes, 1985; Boltan, 1988; Dembo, 1979; Gerler, 1986; National Commission on Drug-Free Schools, 1990; National Institute of Alcohol Abuse and Alcoholism, 1983; USDHHS, 1991e). The nurturance and development of sound decision-making skills and a respect for self and others begin at an early age. The factors that influence a young person's decision to use alcohol and drugs do not suddenly appear nor do they disappear when participation in informational programs is introduced as an intervention strategy (Dade County Public Schools, 1989; Lingell & Davidhizar, 1991; National Institute of Alcohol Abuse and Alcoholism, 1986; Robins & Przybeck, 1985).

Society is responding to the overwhelming problem of drug abuse among students by the development of early prevention programs incorporating skills which address

inter- and intrapersonal skills. If young people are going to develop the skills needed to confront the temptations and stresses to which they will be exposed, this early education is essential. School programs that provide continuous opportunities for positive experiences, accurate information, and a strong sense of self will assist students of all ages in making healthy decisions about their futures (Bukoski, 1991; Clayton et al, 1991; Hawkins, Lishner, Catalano, & Howard, 1985b; Jensen, 1992; Minnesota Governor's Select Committee, 1989; National Clearinghouse for Alcohol and Drug Information, 1992; U.S. Department of Education, 1986).

Chapter 2

REVIEW OF THE LITERATURE

Introduction

Over the past two decades, increased public concern about substance abuse in the United States has stimulated a major effort on the part of educators, parents, researchers, policy makers, and concerned citizens to find effective strategies to deter the use of illicit drugs, including alcohol, among youth (DeJong, 1987; Johnston et al., 1989; Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990; Polich, Ellickson, Reuter, & Kahan, 1984; USDHHS, 1991c). As a result, a wide variety of substance abuse prevention programs for youth have evolved which differ in orientation, scope, methods, and purpose (Bradley, 1988; Horan et al., 1988; LaChance, 1989; U.S. Department of Education, 1986; USDHHS, 1991c).

The negative effects of substance abuse on the ability to learn and the disruptions in the school environment provide a strong impetus for the schools to find effective solutions to substance use among youth (Anderson & Nash, 1987; Botvin, 1985; Dade County Public Schools, 1989; Jones & Battjes, 1985). The passage of Public Law 99-570, The Comprehensive Drug Abuse Prevention, Treatment, and Rehabilitation Act of 1986, has renewed the mandate and

increased the funding to communities, prevention agencies, and the public schools to deal with substance abuse by young people (USDHHS, 1991e). However, schools attempting to respond to this mandate confront a variety of conflicting claims concerning the "best" program strategies. Thus, planners of prevention programs face a confusing array of contradictory information in attempting to chart a course for local substance abuse initiatives for youth (Botvin, 1986; Flay et al., 1988; Green, 1987).

Pharmacological Effects of Drugs

Used by Adolescents

The following brief summary provides general information on five of the most common types of drugs: stimulants, hallucinogens, opiates, marijuana, and depressants. Alcohol and tobacco are addressed as "gateway" drugs in this chapter. For each category of drug there is a description of its qualities and how it affects those people who use it.

Stimulants

Stimulants can be divided into two groups. The first group is amphetamine-like drugs (also known as "speed" or "uppers") and the second group is cocaine and its destructive derivative, "crack."

Amphetamines are compounds used as stimulants for the central nervous system. Different types of "speed" can be administered in a variety of ways. Pills or capsules are taken orally; speed crystals can be sniffed; and sometimes a solution is made and injected. Methamphetamine or "Crank" is the drug of choice for motorcycle gangs and is generally either injected or sniffed (Minnesota Governor's Select Committee, 1989). Amphetamines are used medically to treat narcolepsy, to achieve behavior modification, and in the past, to treat obesity. These drugs increase heart and breathing rates, elevate blood pressure, dilate pupils, and decrease appetites. Other effects include a dry mouth, sweating, headache, blurred vision, dizziness, sleeplessness, and anxiety. The user may feel moody and can develop a false sense of self-confidence and power. An individual taking amphetamines is prone to behavior that is dangerous both to himself or herself and to others (Jaynes & Rugg, 1988; USDHHS, 1990a). Withdrawal symptoms include fatigue, irritability, hunger, and depression. The length and depth of depression depends on how much and how often the user abused the drug. The process of manufacturing methamphetamine is simple but highly dangerous and frequently causes explosions in the make-shift labs where it is produced (Minnesota Governor's Select Committee, 1989). The West Coast and Texas are both experiencing growth in the

use of methamphetamine, and Drug Enforcement Administration predicts that methamphetamine, because it is cheaper and delivers a longer high, will replace cocaine as the favorite drug of casual users (Minnesota Governor's Select Committee, 1989; USDHHS, 1991a).

Cocaine is extracted from the leaves of the Coca plant. Cocaine is similar to amphetamines in that it stimulates the central nervous system. When first introduced in the 19th century, it was thought to be a wonder drug, with several medical applications ranging from treating digestive disorders, to increasing sexual functions, to serving as a topical anesthetic (Jaynes & Rugg, 1988). The last application is the only valid one. However, because of the dangers of cocaine, the drug is now infrequently used medically as an anesthetic (USDHHS, 1990b).

Cocaine is usually sniffed or snorted through the nose, though some users inject it or smoke it in a form called "freebase" (Minnesota Governor's Select Committee, 1989). Cocaine produces a high in a few minutes which peaks in about 20 minutes and is over in approximately an hour. It dilates pupils, increases blood pressure, heart rate, and body temperature. The user can feel more energetic or alert and have a sense of well-being; however, cocaine can induce or aggravate paranoia and anxiety in some users (Department of Health and Human Services, 1984; USDHHS, 1991a).

Crack is produced inexpensively by using baking soda and heat to convert cocaine into freebase that can be smoked in a pipe. When smoked, the product makes a crackling sound therefore giving rise to the name "crack." Because it is smoked, crack enters the bloodstream through the lungs and reaches the brain almost instantly. This creates a powerful but short, up to 15- to 20-minute high, followed quickly by a deep low that may induce the user to smoke some more.

Cocaine, and hence crack, frequently contains dangerous adulterants such as heroin, amphetamines or PCP (phencyclidine). A single dose of crack or cocaine can cause death by producing heart seizures or heart and respiratory failure. Highly conditioned athletes seem particularly prone to first-time use fatalities. It appears that cocaine may also be the most powerful drug of all in producing psychological dependence (Jaynes & Rugg, 1988; USDHHS, 1991a). Cocaine and crack have caused an explosion of crime in our nation's cities driven both by the addictive and pharmacological properties of the drug and by the immense economic rewards of selling the drug (Minnesota Governor's Select Committee, 1989).

Hallucinogens

Hallucinogens are drugs that cause radical changes in mental state or mood. Hallucinogens alter the perception of objective reality. They allow the user "to see" what she or

he is feeling (Jaynes & Rugg, 1988). Drugs that are considered hallucinogens include the following: Mescaline, Psilocybin, LSD (lysergic acid diethylamide), MDA, and recently the new so-called designer drug, "ecstasy." (Usually intended to duplicate the effects of specific controlled substances, designer drugs are synthetic drugs that are developed through experimentation in illegal, clandestine labs by street chemists.) (Minnesota Police and Peace Officers Association, 1990). Hallucinogenic drugs have no proven medical uses (Department of Health and Human Services, 1984). The effect of the drugs, depending on the drug, can last from 1 to 12 hours. LSD is taken as a powder, in a pill form, or soaked on a blotter which is eaten by the user. It is not considered addicting but hallucinations can lead to suicide or psychotic behavior. Mescaline is found in the peyote cactus; it is dried and then either eaten or taken in liquid form. It is milder than LSD, and can produce nausea. Psilocybin (also known as "shrooms") is a type of mushroom that is eaten. It is similar to the previous two substances but its effects, depending on the amount eaten, generally last only a few hours and peak in 90 minutes (Minnesota Governor's Select Committee, 1989). MDA, a synthetically produced amphetamine derivative, is taken orally in tablets or powder form, is made in clandestine labs, and has effects similar to others

but generally lasts only an hour (Department of Health and Human Services, 1984). STP is also a synthetic substance that has amphetamine properties along with an effect similar to LSD. Its effects last several hours. Ecstasy is promoted as producing a feeling of warmth, comfort, and confidence; however, little is known of the long-term or side effects of this drug (Minnesota Governor's Select Committee, 1989). The main acute danger with hallucinogenic drugs is the loss of contact with reality and resultant dangerous behavior (USDHHS, 1990a). Long-term effects, including return of hallucinations, may be a significant danger in some individuals.

Though not technically a hallucinogen, phencyclidine ("PCP" or "angel dust") is thought by street users to produce certain mild hallucinogenic side effects (Jaynes & Rugg, 1988). Generally, PCP produces a feeling of intoxication. With increased dosage the user may experience stupor or coma. Most commonly it is taken as a powder in conjunction with other drugs or unknowingly as a substitute for other street drugs. Overdosage can be dangerous.

Opiates

Opiates are central nervous system depressants derived from the seed pod of the Asian poppy. They include opium, codeine, morphine, and their derivatives (such as heroin). There are also manufactured opiates such as meperidine

(Demerol) and methadone. These drugs have been used medically and recreationally for centuries. Heroin was first used in the 19th century as a cure for morphine and opium addiction (Jaynes & Rugg, 1988). Heroin is taken from powder which is liquefied and then cooked down for use. Though some users sniff the drug, most prefer intravenous use which intensifies the feeling of euphoria. The effect of the drug is to give the user a euphoric feeling and to control the perception of pain. Heroin also produces a "rush" which Dr. Eisenberg, a pharmacologist at the University of Minnesota-Duluth, describes as a "whole body orgasm" which is followed by a drowsy feeling (Minnesota Governor's Select Committee, 1989). The addict is not considered dangerous while under the influence of the drug but is considered extremely dangerous when in search of funds to purchase the drug (Department of Health and Human Services, 1984). Withdrawal symptoms of the drug are described as similar to those of a full-blown case of the flu. Present medical use of opiates is primarily for analgesia and anesthesia, although this class of drugs has many other important medical uses.

Marijuana

Marijuana (scientific name, *Cannabis sativa*) with its biologically active ingredient THC, is widely used in the

United States (Ellickson & Bell, 1990). THC is contained in the flowers and the top leaves of the hemp plant (Jaynes & Rugg, 1988). Though the leaves and flowers can be ground up and put into drinks or food, users generally smoke the dried version in a cigarette form or in a water pipe. The pure resin, known as hashish, can be smoked, eaten, or drunk. There is some evidence that marijuana can be used medically to lessen the nausea that accompanies chemotherapy and to treat glaucoma (Minnesota Governor's Select Committee, 1989). Physical effects of marijuana include a faster heartbeat and pulse rate, dry mouth and throat, and bloodshot eyes. Other effects include reduced ability to concentrate, impaired short-term memory, and lessened coordination. Most marijuana users report a feeling of intoxication in which time slows and sensitivity to sights, sounds, and touch is enhanced (Ellickson & Bell, 1990). In certain environments, a user can feel heightened anxiety and paranoia.

Depressants

Depressants include the barbiturates and related sedative-hypnotic drugs. They are generally taken orally or intravenously and function medically as a type of tranquilizer. The main effect is on certain centers in the central nervous system that modulate what we should and

should not do. Depressants are disinhibiting and produce intoxication, mild sedation, and generally a progressive decrease in mental acuity--slurred speech and poor comprehension (Minnesota Governor's Select Committee, 1989). While taking these drugs, the user may be considered dangerous to society because of the lowered inhibitions (Department of Health and Human Services, 1984; USDHHS, 1989). There is also a danger of overdose leading to respiratory depression and death. The withdrawal syndrome for barbiturates can be life-threatening. The withdrawal syndrome starts with excitement which leads to hyperactivity, nervousness, and then grand mal seizures which, if not brought under control, will evolve into a continuous string of grand mal seizures resulting in death.

Alcohol and Tobacco

While this summary has dealt with categories of drugs, it is crucial to note that alcohol and tobacco, known as "gateway" drugs, are the most commonly abused substances (Minnesota Governor's Select Committee, 1989; Towers, 1987a; U.S. Department of Education, 1986; USDHHS, 1989, 1990b, 1991b).

The main active ingredient in alcohol is ethanol which acts as a central nervous depressant. In high doses it will work as an anesthetic. Alcohol creates tolerances, so the more you use, the more you need to achieve the same effect

each time you drink. Prolonged use of larger amounts of alcohol can damage liver, heart, and pancreas and may lead to malnutrition, lowered immunity to disease, and brain or nervous system damage.

Alcohol abuse is familiar to many generations. Many adults remember when drinking was seen as a rite of passage into young adulthood, but that has changed and children are now beginning to drink as an entry into adolescence (Minnesota Police and Peace Officers Association, 1990).

Recent research reveals that approximately 92% of all high school seniors had used alcohol with 66% having used alcohol during the past month (USDHHS, 1991a).

The rate of occasional heavy drinking or party drinking rose from 37% in 1975 to 41% in 1979. It remained at this level through 1983, then fell to a low of 37% in 1985 and 1986 before increasing to 38% in 1987 (USDHHS, 1991a).

About 1 in 20 high school seniors said they drank daily. Approximately 56% of seniors surveyed had begun using alcohol before entering high school. Compared with previous students (prior to the class of 1978), more recent classes of high school seniors began using alcohol at earlier ages. About 10% reported taking their first drink in the sixth grade or earlier; 22% reported using alcohol in

the seventh grade or eighth grade; and 25% during the ninth grade (U.S. Department of Education, 1986; USDHHS, 1991d).

The nicotine in cigarette smoke and other tobacco products is quickly absorbed. Nicotine induces a rise in pulse rate, blood pressure, and causes a tremor. Cessation of tobacco use causes a withdrawal syndrome which takes the form of a severe craving for tobacco with irritability, anxiety, restlessness, and difficulty concentrating.

Cigarette smoking has been recognized as one of the Nation's leading preventable causes of disease, disability, and death (USDHHS, 1990a). Research has established the causal link between cigarette smoking and cancer and has associated this habit with increased incidence of other serious and often fatal health consequences, e.g., coronary heart disease and arteriosclerotic and peripheral vascular disease (USDHHS, 1990a, 1991a).

Tobacco has been consumed for several hundred years, and the dependence-producing qualities of nicotine were suspected long before they were systematically investigated. Adverse health consequences were also attributed to the drug's use before they were scientifically explored. Since the 1970s the biological basis for tobacco use and nicotine's dependence-producing effects has been the subject of intense research study. Data from national surveys of drug use also make clear that there is an association

between the use of tobacco and other forms of drug dependence (USDHHS, 1989, 1990b, 1991b).

Research reveals that tobacco use is involved in the initiation of other psychoactive drug use and that smoking levels are often related to the use of other abusable drugs (USDHHS, 1989, 1991a). One of the strongest findings illustrated by the data from the National Household Survey (National Institute on Drug Abuse, 1986), is the striking relationship between cigarette smoking and the use of alcohol, cocaine, and marijuana. The use of smokeless tobacco is also associated with that of illicit drugs. Individuals who increased their use of smokeless tobacco over a 9-month period also increased the likelihood of their using an illicit drug or increasing their use of illicit drugs already tried (USDHHS, 1991a).

Historical Perspective of Drug Abuse Prevention

Prior to the 1960s, drug abuse was considered to be a function of the laws passed to regulate drug abuse. When the laws were not effective as deterrents for some individuals, it was expected by government officials and the public that secondary prevention through arrest and rehabilitation would solve the drug abuse problem.

The American response to drug abuse prevention was two-fold. First, there has been an attempt to remove elements that cite the benefits of drug abuse (people and messages).

Second, the drug-free population has been educated with information about drug risks. Since the mid-1960s, the amount of information on drugs has accumulated significantly. The response by the federal government was to spend many millions of dollars on education, information, and training. For example, in 1970 the federal expenditure for drug prevention was \$15.9 million. Two years later, the expenditure rose to \$67.6 million. All state departments of education received federal funds for the development of curriculum guides and consultants to assist teachers and administrators. In 1972, for example, the Office of Education provided \$2.6 million to state education agencies without requiring program summaries or evaluation. Under regulations for Title I of the Higher Education Act of 1965, program guidelines for federally-funded drug information-education programs were set forth without sufficient staff allocated to check on compliance (National Commission on Marijuana and Drug Abuse, 1973).

In addition, state departments of mental health were also responsible for starting many drug education programs. The National Institute on Mental Health was the funding source for some of the projects. Again, evaluation of the program's success was limited due to insufficient funds. As a result, some school districts recruited school guidance counselors or physical education teachers to be drug

education experts, expecting those persons to provide whatever they could in the area of drug education, generally without the benefit of guidelines, criteria, or effective supervision. On the other end of the spectrum were the school districts that made arrangements with consultants to develop pretested curricular materials and assess their effectiveness (National Commission on Marijuana and Drug Abuse, 1973).

There have been programs supported by large foundations or national organizations. The Advertising Council, for example, estimated an investment of \$37 million in 1971. Professional trade and industry groups have sponsored drug education of various types for different target groups, utilizing many approaches. Educational programs provided by churches, civic groups, businesses, national voluntary organizations, and military services have been conducted throughout the United States (National Commission on Marijuana and Drug Abuse, 1973).

According to the second part of the National Commission on Marijuana and Drug Abuse, by 1973 drug abuse program providers were only beginning to consider evaluation and goals for drug education. The position taken by the Commission at that time was twofold: (a) Most drug information had little scientific accuracy and (b) communication theory was absent from most education

programs. An example of this rests in the 1972 National Education Association Task Force on Drug Education report, which cited that the material used in the schools was often false, having been produced by commercial agencies more concerned with profit than quality in program development. The conclusion of the task force indicated that the use of these materials posed more harm than using no materials at all.

Americans have historically depended on education to provide solutions to social problems (McCurdy, 1986; Minnesota Governor's Select Committee, 1989; National Clearinghouse for Alcohol and Drug Information, 1992). Drug education developed as a reaction to do something to prevent drug use among young people (National Institute of Alcohol Abuse and Alcoholism, 1986; Towers, 1987a). However, there has been change over time concerning the idea that information about potentially harmful substances will have a positive influence on behavior. Preventive education has been implemented with public funds, then terminated due to the opinion that the information only caused unhealthy curiosity.

By 1972, the impact of drug education programs or other activities utilizing information to change behavior had not been evaluated. However, these programs were obtaining increased financial support and classroom time allotment. A

Commission-sponsored study found that the drug curricula reviewed were based on the opinion that drug abuse would be positively combated by students' accurate knowledge of drugs (Boldt, Reilly, & Haberman, 1973). As a result of these findings, the Commission issued the statement that policy makers should consider declaring a moratorium on all drug education programs in the schools until evaluations and realistic objectives could be achieved.

In assessing drug education programs, by the early 1970s the Commission was unable to recommend any as having proven successful. The major approaches used in most programs were inconsistent with successful educational practices. The program often took a "fear tactics approach," using physicians, law enforcement officers, and/or "ex-addicts" to deliver information that was biased, exaggerated, or inaccurate. Even accurate information given in a fear-oriented manner was deemed counterproductive by the Commission. During the late 1960s, scientific knowledge to prove that marijuana was harmful did not exist. This lack of concrete information hit hardest on drug education programs that were based on scare tactics (National Commission on Marijuana and Drug Abuse, 1973).

Recommendations made by the Commission included:

(a) combining information about drugs and drug use with broader mental hygiene or problem-solving courses;

(b) integrating drug-related instruction into the total school curriculum based on a survey (Boldt et al., 1973); (c) involving students in the adult society in educational and productive ways so as to provide students with self-esteem and self-fulfillment; and (d) use of a community-wide strategy where all community members, not just the schools, receive drug use information and work for a positive outcome (National Commission on Marijuana and Drug Abuse, 1973).

Trends in drug education have evolved around a philosophy that drug abuse is seen as an integral part of the society. Drug abuse prevention experts have agreed that abstinence by children, while a desirable goal, is not realistic (Wepner, 1979). Wepner supported the following goals for present drug prevention programs: (a) help students recognize the reasons for their behavior; (b) provide students with alternatives to existing behavioral patterns; (c) through self-understanding, enable students to cope with their problems; (d) assist students in identifying strengths and successes; and (e) support attitudinal changes resulting in program participation to translate into long-term behavioral changes. Emphasis on developing decision-making skills in students so that there is less influence by peer groups was considered as an important goal by Wepner (1979).

Family counseling in lieu of working with individual students has become a desirable goal. This practice goes hand in hand with programs servicing youth who have become involved in the juvenile justice system (Wepner, 1979).

Schools with currently operating drug abuse prevention programs have employed the peer group concept. This program can utilize students with strong leadership abilities, i.e., student government members, athletes, or others whom students emulate and follow. These individuals have successfully acknowledged their self-worth and taken responsibility for themselves and others. Their decision-making skills are well developed and they have established their belief systems. This type of group, according to Wepner (1979), can positively instill the attitude that drugs are not "in." This approach, in addition to the emphasis on positive peer group recognition, also combines with community support to provide alternative experiences for youth outside the school setting.

Group process drug education has been proposed as effective (Schaps, DiBartolo, Palley, & Churgin, 1981). In this type of program, the key is personal interaction of students in small discussion groups to share ideas, feelings, and experiences. The role of the educators is that of facilitators with the responsibility of creating and maintaining a safe environment allowing honest, open

expression of ideas. The focus of group process as a drug prevention program is the discussion of the meaning or function of drug use in the lives of students.

A comprehensive study by Schaps et al. (1981) reviewed 127 primary drug abuse prevention program evaluations issued between 1968 and 1977. The report found that the majority of the programs, 56%, could be described as short term. Programs falling into this category were at times only one or two hours in duration, encompassing a film or one-time speaker. Others that lasted several weeks or months were only limited additions to the normal school curriculum. Another 36% of the programs evaluated were considered ongoing since they were established as part of the school program. The remaining 8% were programs that were no longer being implemented, usually due to short-term funding.

According to the Schaps et al. (1981) study, the 127 studies reviewed represented a high percentage of the prevention program evaluations available as of October 1977. The statistics of the Schaps et al. study supported the National Commission on Marijuana and Drug Abuse (1973) report on several issues: (a) Of the 75 reports reviewed, which contained 127 program evaluations, 55% were unpublished manuscripts, 14% were developed as reports to funding agencies, 31% were published in books or journals,

and therefore, the majority of the evaluations were not made public; (b) 84% of the evaluations were written between 1973 and 1977, and a meager 16% appeared prior to the second report of the Commission; and (c) out of the 127 evaluations, only 10 met the criteria for exemplary programming and quality evaluation.

Another important finding of the Schaps et al. (1981) report was presented through statistical data on target populations served by the programs reviewed. Of the 127 programs, 56% were at the high school level, 40% at the junior high level, 18% for students 9 to 11 years of age, 6% for students 6 to 8 years of age, 4% for adults ages 23 to 30, and 6% for adults aged 31 to 59. The total may exceed 100% because programs may serve target populations spanning several categories.

The Schaps et al. (1981) report supported current theory in prevention on the importance of affective skills and strengths in lowering drug abuse. The report findings showed that programs utilizing affective and affective plus information strategies showed the greatest increase in outcome ratings (drug use, intentions to use, and/or attitudes toward use).

Current Trends in Drug Abuse Prevention Programs

The trends in prevention education appear to be moving toward health awareness and broad-based community programming (Brandon, 1992; USDHHS, 1991d, 1991e).

Since drug and alcohol abuse prevention is a logical component of a comprehensive health promotion program, adolescent smoking, drinking, and drug use should be key issues to be covered in the curriculum.

Recent theoretical and empirical work in child social development offers considerable guidance identifying promising new approaches to primary preventions (Botvin, 1985; USDHHS, 1991e). Children's psychological and social health as well as physical health may have widespread and enduring effects and benefits for all children, especially those likely to be at risk for mental, emotional, or social problems such as alcohol and other drug use, need programs to emphasize the building of skills rather than providing information (Pellow & Jengeleski, 1991).

Prevention research and studies are finding that the most promising approach to preventing alcohol and other drug problems is coordinated prevention efforts that offer multiple strategies, provide multiple points of access, and coordinate and expand citizen participation in community activity (Hansen, Johnson, Flay, Graham, & Sobel, 1988;

Hawley, 1990; Johnston, O'Malley, & Bachman, 1986; USDHHS, 1991d).

Current trends in prevention education also are emphasizing the promotion of skills, knowledge, and values of individual students; the development and promotion of positive school climate; the empowerment of parents; and the involvement by multiple sectors of the community (Minnesota Department of Education Community Education, 1992; Ringwalt, Ennett, & Holt, 1990; USDHHS, 1991e).

Parent power has also taken its position in drug abuse prevention efforts (Dupont, 1980; Kafka & London, 1991; McCurdy, 1986; National Clearinghouse for Alcohol and Drug Information, 1992; Polich et al., 1984). During the prior decade, parents were put into the position of being causes of drug abuse or being ignorant of drug problems. While some drug abuse prevention experts are not turning to parents on a wide scale for assistance, parents have realized their own power to become one of the sources of drug abuse prevention (USDHHS, 1991c). Groups illustrating this parent movement include: Parent Peer Groups, Citizens for Informed Choices on Marijuana, the Parents' Resource Institute for Drug Education (PRIDE), the Interstate Movement Against Decriminalization of Dangerous Drugs (I'm MAD), National Drug Abuse Foundation, Parents for Drug Free

Youth, and People Who Care (U.S. Department of Education, 1986; USDHHS, 1991e).

The Role of the School in Adolescent Substance
Abuse Prevention Programming

The concept of substance intervention operated through the public schools was one questioned by many school administrators (Green, 1987). Some educators debate the notion that schools are for education, not medical or mental health treatment; that the schools do not have the responsibility for solving students' emotional and physical problems (Green, 1987). However, when school is the only constant in an adolescent's life and when children of all ages bring their problems to the school environment, some educators argue that the school has the obligation to address these problems and try to implement change (Bennett, 1986; Collabollata et al., 1983; Friedman, Glickman, & Utada, 1985; Minnesota Department of Public Safety, 1990; National Commission on Drug-Free Schools, 1990).

It is not realistic to expect the schools to be solely responsible for the problems of substance abuse in adolescents as well as for its solution (Botvin, 1985; Dade County Public Schools, 1989; Fisher, MacKinnon, Anglin, & Thompson, 1987; Leatt, 1987; Minnesota Governor's Select Committee, 1989; National Clearinghouse for Alcohol and Drug

Information, 1992). It is easy for parents, politicians, and other community members to unload the problem on schools. Schools provide a great setting for programs focusing on awareness and prevention, which make a vital contribution to the ongoing fight against substance abuse (Dade County Public Schools, 1989; Fredisdorf, 1989; McCurdy, 1986; Montgomery Public Schools, 1987; National Clearinghouse for Alcohol and Drug Information, 1992).

The major components of the school's anti-drug effort are early intervention and prevention activities (Benard, Fafoglia, & Perone, 1987; Bennett, 1986; DeJong, 1987; LaChance, 1989; Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990; U.S. Department of Education, 1986). Although no prevention approach has proven to be totally effective, programs based on the reasons students take substances, such as social pressures, may hold the most promise (Bradley, 1988; Clayton et al., 1991; LaChance, 1989; Resnick, 1988).

School substance prevention and intervention programs that work and last have the following characteristics: one person in charge, their own budget and staff resources, and well-thought-out, consistently implemented policies and rules (Johnston et al., 1989; U.S. Department of Education, 1986). They also are usually staffed by highly dedicated

and enthusiastic people who receive both school staff and members of the community. Successful prevention programs are also consistent from one school to another within the same school district (Dade County Public Schools, 1989; DeJong, 1987; Minnesota Department of Public Safety, 1990; Towers, 1987a).

Adolescent Substance Abuse Prevention

Past substance prevention programs that have failed were most likely grounded on incorrect assumptions about why adolescents begin using psychoactive substances (Polich et al., 1984). The object is to aim at the reduction, delay, or prevention of substance abuse before it has become habitual or clearly dysfunctional (Boltan, 1988; Kim et al., 1990).

Primary prevention is focused on early stages, trying to keep young people from ever starting at all, or if they have experimented, from shifting into regular use. Most primary prevention programs are aimed toward younger populations or groups of adolescents who have not been identified as having a substance use problem and are not "at risk" for developing a problem (Beschner & Friedman, 1985; Fredisdorf, 1989; Goodstadt, 1981; Moskowitz, Malvin, Schaeffer, & Schaps, 1984; USDHHS, 1990b, 1991e).

Secondary and tertiary prevention programs face more difficult odds than primary prevention programs (Department

of Health and Human Services, 1984; Goodstadt, 1981). There is now evidence to support the theory that the longer a person delays substance involvement, the more likely it is that he or she will be able to stop using in the future (Minnesota Department of Public Safety, 1990; Polich, et al., 1984; Towers, 1987a; U.S. Department of Education, 1986).

Types of Substance Abuse Programs

Information-only programs may increase knowledge about substances, but evidence does not suggest that they affect actual behavior (U.S. Department of Education, 1986; USDHHS, 1990b, 1991a). Some experts have even claimed that these programs cause increased substance use (Polich et al., 1984). The main assumption underlying most of these programs is the belief that a change in attitude will lead to a change in behavior.

Affective education programs focus on such things as values clarification, improving self-esteem, and decision-making skills. An inherent weakness in these programs is that they are extremely difficult to implement (Botvin, 1985). The goal of many of these programs is to try to effect a change in self-concept, something that is the product of the adolescent's entire life experience (Miller, 1988). Evidence that short-term programs can raise

elf-esteem is limited, and current research is questioning the relationship between low self-esteem and the onset of substance use (Berdiansky et al., 1988; Ellickson & Bell, 1990; Horan et al., 1988).

Schools can be of assistance to high-risk students and families in several ways. Special programs for high-risk children have been developed based on the employee assistance program model (Morehouse, 1979; National Clearinghouse for Alcohol and Drug Information, 1992; USDHHS, 1990b, 1991d). Schools can also be the focal point for parental programs that teach enhanced family communications and other skills (Bry, 1983; Dade County Public Schools, 1989; Hawkins et al., 1985a; Resnick, 1988).

Making available the best substance education curriculum based on the correct assumptions about why adolescents begin using chemical stimulant substances is not enough (Polich et al., 1984). The factors that contribute to adolescent substance abuse are too complex. Steps must also be taken to ensure that community support remains consistent and leads to a variety of school-based and non-alcohol-based programs available and accessible to all pre-adolescents and adolescents (Berdiansky, et al., 1988; Bry, 1983; National Commission on Drug-Free Schools, 1990; USDHHS, 1991e).

Curricula for the Prevention of Substance Abuse

Now it is understood that substance abuse is associated with a variety of social, interpersonal, and behavioral factors (Blau et al., 1988; Bry, 1983; Clayton et al., 1991; Gonzales, 1989; Johnston et al., 1989; Leatt, 1989; Resnick, 1988). Most health education curricula today are a great deal more comprehensive than in previous years. Most of them are based on the research that emphasizes self-esteem, decision-making, and refusal skills, and pertinent information about the effects of substances (Bradley, 1988; LaChance, 1989; Towers, 1987a).

Curricula specialists involved in the field of drug and alcohol abuse prevention are now designing programs aimed at younger children. Upon examination of the programs for elementary school students, one recognizes several prevalent themes that extend beyond the dispensing of information about drugs and alcohol and their effects on the body (USDHHS, 1991d, 1991e). Towers (1987a) pointed out that drug abuse is associated with a variety of social, interpersonal, and behavioral factors that must be addressed if a prevention program is to be successful. Studies conducted by the U.S. Department of Health and Human Services (1984) found that teenagers who seek treatment for alcohol problems often experienced social alienation,

deficiencies in social competencies, uncertainty of values, difficulty making decisions, low levels of self-esteem, and undue influence of peers. These are characteristics that begin their formation early in life. Thus, successful prevention demands early attention to a combination of affective, attitudinal, and behavioral components in addition to the dissemination of accurate information.

A review of the literature in the area of substance abuse prevention programs at the elementary level revealed several common components that appear to form the basis of a successful program. The two areas addressed the most frequently are the development of appropriate social skills and the nurturance of self-esteem (Berdiansky et al., 1988; Gerler, 1986; Green & Kelly, 1989; Hawkins, 1985a; LaChance, 1989; Miller, 1988; Towers, 1987a).

Communication skills and cooperation are emphasized and practiced in many curricula. A study conducted by Dupont and Jason (1984) showed that assertiveness training tended to increase the total amount of attitude change in the conservative direction regarding drug and alcohol use. Peer selection and techniques for resisting peer pressure are addressed in many programs. In order to promote self-worth, these programs introduce self-assessment skills and opportunities for students to use their own judgement, and

evaluate their behavior and its consequences. The teaching of laws and rules as well as social consequences should be among the components of a prevention program (Bennett, 1986; Minnesota Department of Public Safety, 1990; Resnick, 1988; Richmond & Peeples, 1984).

Students who have become involved with drugs have reported that they trace their susceptibility to substance abuse to a low self-concept in elementary school (Montgomery County Public Schools, 1987). Richmond and Peeples (1984) reported a high correlation between drug abuse and low self-esteem. This is further emphasized by Dupont and Jason (1984). Activities that enhance the development of a positive self-concept should be a major part of any prevention program (USDHHS, 1990b, 1991e).

The following are four recommendations for those in charge of planning and implementing substance abuse prevention programs in the public schools (U.S. Department of Education, 1986).

1. Use a broad-based approach. Deter substance use by limiting availability of substances on and around school property and imposing rigid and consistently enforced penalties for use, possession, and distribution. Continue to provide information about the effects of substances in a factual manner, emphasizing their short-term or immediate

physical and social effects. Provide social skills training, including how to analyze the consequences of individual choices and identify alternative behaviors consistent with the individual's value system. Schools and community organizations must cooperate with the home and other agencies to provide more responsible and age-appropriate alternative activities that help youngsters increase their bonds with school, family, and community (Leatt, 1989; McCurdy, 1986; National Commission on Drug-Free Schools, 1990; National Institute of Alcohol Abuse and Alcoholism, 1983).

2. Start prevention activities early. According to many experts, early age of substance use is one of the best predictors of future serious abuse (National Commission on Drug-Free Schools, 1990; U.S. Department of Education, 1986). Prevention efforts should begin before youngsters are the age of 12 and faced with hard decisions. Putting prevention programs in place in elementary schools is critical (DeJong, 1987; Johnston et al., 1989; LaChance, 1989; Minnesota Governor's Select Committee, 1989; National Commission on Drug-Free Schools, 1990; Resnick, 1988; Towers, 1987b). Also, special efforts should be made to bolster prevention activities during especially traumatic and vulnerable times, just before the transitions to middle

school and to senior high school (Dade County Public Schools, 1989; Ficklen, 1990; National Institute of Alcohol Abuse and Alcoholism, 1983; Resnick, 1988; U.S. Department of Education, 1986).

3. Help high-risk students first. We know from research, experience, and common sense that some students are at greater risk of becoming substance abusers than others (Battjes, 1985; Blau et al., 1988; Dade County Public Schools, 1989). Sometimes these children exhibit their vulnerability early in their school careers, but more often they are noticed in middle school and senior high school. This is not to say that prevention programs should not be offered to all students. When students are identified as being at high risk, they should be given additional help immediately.

4. Cover all bases. Prevention efforts should be a continuum of interrelated and complementary activities including those at school, at home, and in the community (Berdiansky et al., 1988; Dade County Public Schools, 1989; Edmonds, 1982; Minnesota Governor's Select Committee, 1989; National Institute of Alcohol Abuse and Alcoholism, 1983). Prevention efforts must extend beyond information and awareness to social-environmental, interpersonal, and behavioral factors. Children become involved with

substances by starting "gateway" substances such as tobacco and alcohol. We must concentrate early in students' lives on showing them the dangers in using these harmful substances (Boltan, 1988; Bradley, 1988; Resnick, 1988; U.S. Department of Education, 1986). Everyone's help should be enlisted, including that of successful non-substance-using students who can serve as positive peer role models (Green, 1987; Huba & Bentler, 1980; Minnesota Governor's Select Committee, 1989).

Project DARE Substance Abuse Prevention Program

Drug Abuse Resistance Education (DARE) is a drug abuse prevention education program designed to equip school children with skills for resisting peer pressure to experiment with tobacco, drugs, and alcohol. This program, which was developed in 1983 as a cooperative effort by the Los Angeles Police Department and the Los Angeles Unified School District, uses uniformed law enforcement officers to teach a formal curriculum to students in a classroom setting. DARE gives special attention to fifth or sixth grades to prepare students for entry into middle/junior high school and high school, where they are most likely to encounter pressures to use drugs (U.S. Bureau of Justice, 1990).

This innovative program has several noteworthy features (DARE America, 1990; DeJong, 1987):

1. DARE targets elementary school children. Junior high and high school substance education programs have come too late to deter substance use among youth in the past. Therefore, substantial numbers of young people have reported initiating use of alcohol, tobacco, and marijuana by junior high school (Johnston et al., 1986).

2. DARE offers a highly structured, intensive curriculum developed by health education specialists. A basic precept of the DARE program is that elementary school children lack sufficient social skills to resist peer pressure and to say no to drugs. DARE instructors do not use the scare tactics of traditional approaches that focus on the dangers of substance use.

3. DARE uses uniformed law enforcement officers to conduct the class. Uniformed officers as DARE instructors not only serve as role models for children at an impressionable age, but also have high credibility about the subject of substance use. Moreover, by relating to students in a role other than that of law enforcement, officers develop a rapport that promotes attitudes toward the police and greater respect for the law.

4. DARE represents a long-term solution to a problem that has developed over many years. Many people believe

that, over time, a change in public attitudes will reduce the demand for substances. DARE seeks to promote that change. Equally important, DARE instructors help children develop mature decision-making capabilities that they can apply to a variety of situations as they mature.

In 1988, the Bureau of Justice Assistance, Office of Justice Programs, U.S. Department of Justice, became actively involved in the support of the DARE program by awarding grants for the funding of four Regional Training Centers to disseminate the DARE program. These grants were awarded to the Arizona Department of Public Safety, Illinois State Police, Los Angeles Police Department, and Virginia State Police. In 1989, the North Carolina State Bureau of Investigation was funded as the fifth Regional Training Center (U.S. Bureau of Justice, 1990).

The major goal of DARE is to prevent substance abuse among school children (Clayton et al., 1991; DeJong, 1987; U.S. Bureau of Justice, 1990). The DARE program targets children at an age when they are most receptive to drug prevention education and before they are likely to have been led by their peers to experiment with tobacco, alcohol, and drugs. DARE seeks to prevent adolescent substance abuse, thus reducing the demand side of drugs. DARE lessons focus on the following five points (DARE America, 1990; U.S. Bureau of Justice, 1990):

1. To provide the skills for recognizing and resisting social pressures to experiment with tobacco, alcohol, and drugs
2. To help enhance self-esteem
3. To teach positive alternatives to substance use
4. To develop skills in risk assessment and decision making
5. To build interpersonal and communications skills

DARE achieves these objectives by training carefully selected veteran law enforcement officers to teach a structured, sequential curriculum in the schools (U.S. Bureau of Justice, 1990).

The DARE curriculum includes parents, as the developers of the program realize that parental cooperation and understanding are essential to any effective substance abuse prevention effort (U.S. Bureau of Justice, 1990). Parents are invited to an evening session called the parent education evening. At this session the DARE officer explains the DARE program and provides the opportunity for parents to review the curriculum, answering any questions that might be raised regarding the program and its contents. At the parent education evening the DARE officer will show a film, "Sons and Daughters--Drugs and Booze" (U.S. Bureau of Justice, 1990). This film illustrates for parents how drugs

and alcohol can effect their children. The DARE officer then leads a discussion on topics such as improving the family communication, recognizing and responding to symptoms of substance use in children, and information concerning local resources.

Organizers of the DARE program understand that police, educators, and others who are committed to the success of the DARE program must ensure that the program is visible and widely accepted. Meeting with groups representing all segments of the community promotes the level of community understanding and support that is essential for DARE's successful implementation (U.S. Department of Justice, 1991). Community support may also help to ensure program continuity. Community service organizations frequently supplement program resources by paying for student workbooks or providing student T-shirts or other promotional materials that demonstrate the community's commitment to substance use prevention (U.S. Department of Justice, 1991).

The Project DARE curriculum is organized into 17 classroom sessions conducted by the police officer, coupled with suggested activities taught by the regular classroom teacher. A wide range of teaching activities are used: question-and-answer, group discussion, role-play and workbook exercises, all designed to encourage student participation and response.

The following brief summaries of each lesson capture the scope of the DARE curriculum and show the care taken in its preparation. All of these lessons were pilot tested and revised before widespread use began (U.S. Bureau of Justice, 1990).

1. Practices for Personal Safety. The DARE officer reviews common safety practices to protect students from harm at home, on the way to and from school, and in the neighborhood.

2. Drug Use and Misuse. Students learn the harmful effects of drugs if they are misused as depicted in the film, Drugs and Your Amazing Mind.

3. Consequences. The focus is on the consequences of using and not using alcohol and marijuana. If students are aware of those consequences, they can make better informed decisions regarding their own behavior.

4. Resisting Pressures to Use Drugs. The DARE officer explains different types of pressure, ranging from friendly persuasion and teasing to threats, that friends and others can exert on students to try tobacco, alcohol, or drugs.

5. Resistance Techniques: Ways to Say No. Students rehearse the many ways of refusing offers to try tobacco, alcohol, or drugs--simply saying no and repeating it as often as necessary; changing the subject; walking away or

ignoring the person. They learn that they can avoid situations in which they might be subjected to such pressures and can "hang around" with nonusers.

6. Building Self-Esteem. Poor self-esteem is one of the factors associated with drug misuse. How students feel about themselves results from positive and negative feelings and experiences. In this session students learn about their own positive qualities and how to compliment other students.

7. Assertiveness: A Response Style. Students have certain rights--to be themselves, to say what they think, to say no to offers of drugs. The session teaches them to assert those rights confidently and without interfering with others' rights.

8. Managing Stress Without Taking Drugs. Students learn to recognize sources of stress in their lives and techniques for avoiding or relieving stress, including exercise, deep breathing, and talking to others. They learn that using drugs or alcohol to relieve stress causes new problems.

9. Media Influences on Drug Use. The DARE officer reviews strategies used in the media to encourage tobacco and alcohol use, including testimonials from celebrities and social pressure.

10. Decision-Making and Risk-Taking. Students learn the difference between bad risks and responsible risks, how to recognize the choices they have, and how to make a decision that promotes their self-interests.

11. Alternatives to Drug Abuse. Students learn that to have fun, to be accepted by peers, or to deal with feelings of anger or hurt, there are a number of alternatives to using drugs and alcohol.

12. Role Modeling. A high school student selected by the DARE officer with the assistance of the high school staff visits the class, providing students with a positive role model. Students learn that drug users are in the minority.

13. Forming a Support System. Students learn that they need to develop positive relationships with many different people to form a support system.

14. Ways to Deal with Pressures from Gangs. Students discuss the kinds of pressures they may encounter from gang members and evaluate the consequences of the choices available to them.

15. DARE Summary. Students summarize and assess what they have learned.

16. Taking a Stand. Students compose and read aloud essays on how they can respond when they are pressured to

use drugs and alcohol. The essay represents each student's "DARE pledge."

17. Culmination. In a school-wide assembly planned in concert with school administrators, all students who have participated in DARE receive certificates of achievement.

Prior Findings of Project DARE

Although the DARE program has been in existence since 1983, few evaluations of the program have been reported in the scientific literature. Published evaluations of the DARE program are scarce at this point in time. DeJong (1987) evaluated the program with seventh graders in Los Angeles. His findings suggest that DARE students accepted significantly fewer offers to use drugs and reported significantly lower levels of substance use than control group students. However, DeJong's study was seriously flawed in that it was an after-only design and there was no random assignment into treatment and control conditions (Clayton et al., 1991).

In 1987, an evaluation of the DARE program in Illinois was submitted to the Illinois State Police (Earle, Garner, & Phillips, 1987). The total evaluation consisted of the investigation of three areas of the DARE program by surveying the students, teachers, principals, and parents of

students in the schools. Students were asked if they liked having the DARE program in the classroom, teachers and principals were asked if they thought it appropriate for a police officer to teach the curriculum, and parents were asked if they accepted the program in the community. Administrators, teachers, and parents thought the program was excellent. In order to determine if the program taught students resistance to peer pressure, students were videotaped role playing saying "no" to offers to use drugs. Evaluation of the videotapes indicated that 87% of the students were able to demonstrate these refusal skills after the fifth week of the program and 92% after the 14th week.

In May 1988, the DARE program was evaluated in Austin, Texas (Austin Independent School District, 1988). Surveys were submitted to school administrators and teachers at schools which received DARE instruction. Questions referred to the appropriateness and effectiveness of the DARE materials, the presentations to fifth grade students, the correlation of the program with the Texas Essential Elements of Instruction, the feeling of trust and cooperation between the students and the law officers, the projection of the long-term effect of the program on students, and the usefulness to students of the behaviors and skills presented in the DARE curriculum. The findings from these surveys of

responses by administrators and teachers indicated that the program was well received by the staff members who were involved in the implementation of the program in these Austin schools.

In July 1988, a DARE longitudinal evaluation report was prepared by the Evaluation and Training Institute of Los Angeles. This study was designed to evaluate the long-term effectiveness of the DARE program by tracking and surveying the same students each year from sixth to eighth grade and comparing the responses of DARE participants with those of students who did not participate in the program. Students were questioned on personal drug use, attitudes toward drugs, and self-esteem. These students were surveyed three times from 1985 to 1988. Sample sizes ranged from 567 students to 1,240 students.

Results of the study indicated that there was a difference between DARE and non-DARE students in reported use of all categories of alcohol, tobacco, and drugs; DARE students showed a lower rate of use. There was a decreasing rate of cocaine use among DARE students while cocaine use was increasing in the non-DARE group. The study revealed that DARE students showed a slight tendency to experiment less frequently with drugs such as LSD, uppers, downers, inhalants, and other drugs not prescribed by doctors.

Results also found that there was no difference found between the two groups of students in attitudes toward drug use or self-concept.

Faine and Bohlander (1988) examined pre- to posttest differences between DARE and non-DARE students controlling for type of school (rural, parochial, inner-city, and suburban). Self-reported use of drugs was not examined. Self-esteem and attitudes toward the police were significantly different comparing all DARE with all non-DARE students. However, when controls for types of school were instituted, the differences were not uniformly significant. With regard to perceived external control, there were significant differences between treatment and control students that remained when controls for type of school were implemented. The DARE curriculum did have the desired effect of producing significantly greater scores on peer resistance skills. In another evaluation of DARE conducted among 400 inner-city youth in Nashville, Faine and Bohlander (1989) found no support for the effectiveness of the DARE curriculum in changing peer resistance or positive attitudes toward drugs. In fact, in this study, DARE students had significantly more negative attitudes toward the police than did the non-DARE students at posttest.

Ennett, Holt, and Ringwalt (1989) evaluated the DARE program in the North Carolina schools by pre- and post-testing fifth-grade students in 20 schools. The instrument in this study was a 54-item survey designed by the researchers to assess attitudes toward drugs, the use of drugs, benefits of drug use, and peer attitudes. The survey consisted of a total of 54 items indicating if usage is good, bad, or neither of the two. Responses to these items were related to having fun, being popular, feeling good, relieving problems, acquiring substances easily, and getting into trouble with the law because of such use. Self-esteem was measured by a 10-item Rosenberg Scale (Ennet et al., 1989).

An evaluation of the DARE program in North Carolina (Ringwalt et al., 1990) focused on pre- to posttest differences for students attending 10 schools randomly selected as control schools. There was no significant effect of the program on self-reported drug use, intentions to use drugs, or self-esteem. However, significant differences in the appropriate direction did appear in attitudes toward drug use in general and attitudes toward specific drugs, in the perception of peers' attitudes toward drug use, in assertiveness, and in recognizing media influences to use drugs.

Clayton and Cattarello (1991) and Clayton et al. (1991) are engaged in a 5-year, cohort sequential study of the effectiveness of DARE in Lexington, Kentucky. In the first cohort, 23 schools were randomly assigned to receive the DARE curriculum and 8 schools were randomly assigned to the control condition where students received the standard health curriculum containing a drug education unit. In the remaining cohorts, all students receive the DARE curriculum. In a pre- to posttest analysis, Clayton et al. (1991) found statistically significant effects on general attitudes toward drugs, on negative attitudes toward specific drugs (e.g., cigarettes, alcohol, marijuana), and on a scale measuring peer relationships. Expected differences in self-esteem and peer pressure resistance were not observed although, for the latter, the results were close to the .05 criterion (Clayton et al., 1991).

In 1992 the St. Paul, Minnesota, schools and the St. Paul police force conducted an evaluation on the DARE program. This evaluation was based upon the following evaluation questions:

1. To what extent were the program activities implemented?
2. What are the characteristics of the student participants?

3. What are the reactions of various constituencies to the program?
4. To what extent were the intended outcomes achieved?
5. What are the strengths and limitations of the program?
6. What approaches might be used for longitudinal follow-up?

Although the primary focus of the evaluation was summative in nature, the evaluation also included formative aspects. Data from such sources as teachers' and principals' questionnaires and parent interviews were collected and used in the research (McCormick & McCormick, 1992).

The findings indicated that the DARE program was being used in 69 classrooms in 18 public and 15 non-public schools. The characteristics of the students by gender were 50.53% girls and 49.47% boys. A breakdown of students by race indicated that 4.81% were American Indian, 14.22% were Asian American, 12.77% were African American, 5.07% were Hispanic American, and 61.48% were White American (McCormick & McCormick, 1992). The study revealed that students, parents, teachers, and police officers were very positive to the DARE program.

The study found statistically significant differences in the Knowledge of Drugs scale but no statistically

significant differences in the Attitude toward Police, Self-esteem, Peer Resistance, and Attitude toward Drugs scale.

Overall, the DARE program achieved major outcomes according to the reported perceptions of teachers and parents (McCormick & McCormick, 1992). However, the need for a longitudinal study of the DARE participants was expressed by many of the people involved with the program.

General Summary

The importance of early prevention and early interventions regarding substance abuse cannot be over emphasized (Bennett, 1986; Boltan, 1988; Jessor & Jessor, 1975; Minnesota Department of Education Community Education, 1992; National Commission on Drug-Free Schools, 1990; USDHHS, 1991c, 1991d). Teachers will continue to play a crucial role on the team of professionals with whom adolescents associate daily (Berdiansky et al., 1988; Dade County Public Schools, 1989; Jensen, 1992; Minnesota Governor's Select Committee, 1989; Moskowitz et al., 1984; National Clearinghouse for Alcohol and Drug Information, 1992).

Schools and teachers cannot do it all (National Clearinghouse for Alcohol and Drug Information, 1992). After all, their primary concern is to instruct students. Students spend a great deal of their time in school, and school personnel are very likely to notice questionable

behaviors. DARE is a chemical substance prevention program which can be established at the upper elementary school level as part of an intensive and thorough school chemical substance prevention education program.

Chapter 3

METHODOLOGY

Introduction and Purpose

The purpose of this study was to determine the impact of the teaching of the Project DARE program on students' knowledge and attitudes toward chemical substance abuse. In this study the teaching of the Project DARE program was utilized to determine if, on a chemical substance knowledge assessment and an attitude survey, results can be improved.

Research Design

In this study the Solomon four group design was used to help eliminate pretest sensitization as a possible threat to the ecological validity of the study. The Solomon four group design is a systematic investigation of pretest effects that is used to achieve three main purposes: (a) to assess the effect of the experimental treatment relative to the control treatment, (b) to assess the effect of a pretest relative to no pretest, and (c) to assess the interaction between pretest and treatment conditions (Borg & Gall, 1989).

In the Solomon four group design the pretest (the knowledge assessment and attitude survey) and the treatment (the Project DARE instruction) are varied as shown in the diagram below (Borg & Gall, 1989):

Group 1. R O X O

Group 2. R O O

Group 3. R X O

Group 4. R O

Key: R = random assignment
X = experimental treatment
O = pretest or posttest

In using this type of research design, the investigator randomly assigned student classrooms and used the following structure:

Group 1 was given the knowledge assessment and attitudinal survey as a pretest. Next, students received the Project DARE instruction as the experimental treatment, and then at the completion of the DARE instruction, the same knowledge assessment and attitudinal survey was given as the posttest.

Group 2 was given the pretest with no Project DARE instruction and then was given the posttest.

Group 3 was not given the pretest but received the Project DARE experimental treatment and the posttest.

Group 4 only received the knowledge assessment and attitudinal survey as the posttest.

This type of research design was justified as there is a high probability that the pretesting may have an effect on the experimental treatment (Borg & Gall, 1989).

Independent Variable

The Project DARE program was chosen as the independent variable in this study. The Project DARE program was selected because it utilizes 17 weekly lessons which are easy to understand, practical, positive, clearly stated, and designed for all ability levels. The student instruction portion of the Project DARE program consists of 17 lessons aimed at: (a) providing students with accurate information about alcohol and drugs, (b) teaching students ways to say "NO" to drugs while providing alternatives to drug use, (c) teaching students decision making skills and the consequences of their behavior, and (d) building students self-esteem while teaching them how to resist peer pressure. The 17 lessons which were taught are as follows (U.S. Bureau of Justice, 1990):

1. Personal Safety Practice
2. Drug Use and Misuse
3. Consequences
4. Resisting Pressures to Use Drugs
5. Resistance Techniques
6. Building Self-Esteem
7. Assertiveness: A Response Style
8. Managing Stress Without Taking Drugs
9. Media Influences on Drug Use
10. Decision Making and Risk Taking

11. Alternatives to Drug Use
12. Role Modeling
13. Forming a Support System
14. Resisting Gang Pressure
15. Dare Summary
16. Taking a Stand
17. Culmination

The lesson format included an introduction, a review of previously covered instruction, large group discussions, small group discussion, hands on experiences, and a short quiz that covered the objectives of the day.

The instruction occurred once a week during a 50-minute period. During the 17 weeks of the experimental treatment, the time slot was determined by the various schools using the program.

Dependent Variable

A 36-question multiple choice criterion referenced assessment based on the Project DARE lesson objectives was used as the pretest and posttest to measure knowledge gained. A 74-question attitudinal survey taken from the St. Paul Police DARE Survey was used to determine attitudinal changes. The knowledge assessment and attitudinal survey was given before the beginning of the Project DARE instruction with the same assessment and survey administered 17 weeks later at the conclusion of the Project DARE

instruction. A comparison of the chemical knowledge pre- and post-assessment and the pre- and post-attitudinal survey results was used to determine if any improvement took place during the experimental treatment of the Project DARE instruction.

Construction of the Assessments

An assessment to evaluate the knowledge gained from the teaching of the Project DARE program was developed from a prescribed test development process. The assessment was derived from stated Project DARE lesson learner outcomes. The assessment was developed by a team of professional educators and police instructors. These professionals included two principals, two classroom instructors, a counselor, the Assessment Specialist from the State Department, and two police officers trained in delivering Project DARE. This team addressed items such as content, item validity, difficulty index, and readability from the pilot study. These items were then taken into consideration when the actual assessments were developed.

This prototype assessment consisted of 33 multiple choice questions written with four choices. This assessment served as the pretest and the posttest in this study. The assessment was field tested in a pilot study of over 100 students during the spring of 1992 and was critically analyzed and reviewed to identify difficulty index, and item

validity. From this experience and the results of the item analysis, the prototype assessment was revised to create an effective assessment instrument.

The attitudinal survey was derived from the St. Paul Police DARE Program Survey. The survey was a 74-question survey that incorporated a Likert scale in which the student checked one of five possible responses to each statement: strongly disagree, disagree, undecided, agree, and strongly agree. The attitudinal survey was administered in a pretest and posttest format to the scheduled groupings that coincide with the Solomon four group research design.

The attitude survey posttest was divided into six scales: drug knowledge, chemical usage, attitude toward police, self-esteem, resistance, and attitude toward chemical substances.

The internal consistency reliabilities for each of the scales, except the chemical usage scale, of the attitude survey were computed using Cronbach's alpha (α) by McCormick and McCormick (1992). Cronbach's alpha is a measure of how alike the students' responses are to items within a scale. That is, it measures the extent to which students who strongly agree with one item tend to strongly agree with the other items on the scale, etc.

As shown in Table 1, Cronbach's alpha for the drug knowledge scale is lower than the other scales. It may be that knowledge in one area does not necessarily depend on knowledge of another area regarding drug education. This scale may pinpoint which knowledge items have been successfully taught by the DARE program and which have not. A possible explanation may be that since there were only two answer responses to these items (true/false), the lack of responses made the scale very restrictive in regards to variance. It is difficult to attain a high Cronbach's alpha with this type of restricted variance.

Table 1

Table of Cronbach's Alpha for Attitude Survey Scales

Scale	Cronbach's alpha
Drug Knowledge	.4208
Attitude toward Police	.6811
Self-esteem	.8320
Resistance	.7556
Attitude toward Drugs	.7108
Chemical Use	*

* Data not available.

McCormick and McCormick (1992) addressed content validity by computing for each item the percentage of students getting that question right on the pretest and on the posttest for the knowledge scale for two different samples of students. They found that the percentage of students getting each item correct for both samples increased from pretest to posttest.

To address construct validity for the attitude toward police, self-esteem, resistance, and attitude toward drugs scales, McCormick and McCormick (1992) calculated the percentage of students giving a favorable response to each item (i.e., a score of 4 or 5) on the pretest and posttest. For each scale they found that for most items on that scale the percentage of favorable responses increased from the pretest to the posttest.

In order to administer the assessments efficiently and make directions understandable, the investigator became familiar with the directions and the assessment items before the knowledge assessment and attitudinal survey were given. In addition, classroom instructors were requested to closely monitor the students' assessment/survey taking behaviors to make sure that each child followed the directions, were on the correct item, and marked the assessment or survey correctly.

Precautions were taken to insure the assessment taking setting was comfortable for all students. Distractions such as noise or activities were at a minimum. The assessment and survey were not timed and were read to students.

Sample

This study was conducted in eight randomly selected Southeastern Minnesota elementary schools involving only fifth grade students. All of the schools are located in rural communities that have agribusiness as the base of their economy that are within 20 miles of Rochester. The towns where the schools are located all have a population of under 5,000 people. Fifth-grade student population in the schools range from approximately 50 to 150 students. Student population of the schools consists of a 98% Caucasian population, with Hmong and Southeast Asian students accounting for the greatest portion of the other 2% of the total fifth-grade student population.

Collection of Data

In September 1992, a criterion referenced knowledge assessment and attitudinal survey focusing on chemical substance abuse was administered according to the Solomon four group research design. The investigator administered all of the assessment and survey instruments and will collect all of the assessment and survey data to protect the

rights of the students. After 17 weeks of the Project DARE treatment, the scheduled assessments were retaken by the pretest/posttest groups under nearly identical conditions. In all of the assessments and surveys the investigator administered and collected student responses preserving the confidentiality of the student responses. To further protect the confidentiality of students, the students will be identified by number and not by name on all assessment and survey answer forms. Students who were in the pretest/posttest grouping who did not take the pretest and posttest were eliminated from the sample.

Collection techniques and scoring of the knowledge assessment and attitudinal survey were exactly the same for all groupings in the Solomon four-group research design. Assessment and survey results were scored and recorded by the same person in each grouping.

The treatment and control groups each included at least 50 students.

Treatment of Data

After the data were collected and coded, they were entered into the computer for statistical analysis. A multifactor Analysis of Variance (ANOVA) (Campbell & Stanley, 1963) was run on the collected data. These analyses were used to determine correlations of:

1. the attitude and knowledge pretest and posttest assessment scores
2. the DARE program results versus the non-DARE program results
3. gender
4. family status
5. various combinations of the preceding, for example:
 - a. DARE and gender
 - b. DARE and family status
 - c. DARE, gender, and family status

At the end of this study, the school boards will look at the variables to determine if the Project DARE program is an effective program to gain the knowledge and the attitudes that may be related to the ability of students to resist the use of chemical substances and remain chemically free.

Chapter 4

ANALYSIS OF DATA

The purpose of this study was to determine if significant difference would be found between fifth-grade students who received training in the Project DARE Drug Education program, and students who did not receive the Project DARE Drug Education program, in scores from a chemical substance knowledge assessment and in scores from an attitude survey.

The procedures used to implement and monitor this experiment and to collect and compile the data have been introduced in Chapter 3. In this chapter the data are presented and examined.

The data collected in this experiment were analyzed using the Minitab-Release 7.2 (1988) and the SAS-Version 5.18 (1985) statistical computing packages on the VAX 4000-300 mainframe computer at Winona State University. A three-way Analysis of Variance (ANOVA) was used as the main method of data analysis. Statistical treatment of the data presented in this chapter was performed in consultation with Dr. Carol Blumberg of Winona State University.

The data are analyzed and presented in two major segments. The first segment presents an analysis of the statistics associated with the knowledge assessment. The

second segment presents a more detailed analysis of the data associated with the attitude survey. This segment is divided into six scales which include drug knowledge, chemical usage, attitude toward police, self-esteem, resistance, and attitude toward drugs. The fifth-grade students who received Project DARE instruction constituted the experimental groups while the fifth-grade students who received no Project DARE instruction were the control groups.

Before reporting the results of the Analysis of Variance, it is important to discuss some of the specific data compilation techniques that were used. This will be done in order to set the context for the interpretation of the Analysis of Variance used in the research.

Scantron 882-E scan forms were used to collect data from the students from the assessment instruments. After collection of the student data, the Scantron forms were read into a Scantron 2100 machine for recording purposes. Programs written by Michael Gieske of Winona State University were used to translate the data on the forms into an ASCII file (a way of setting up file which can be read into most microcomputer and mainframe computing packages). Since some students were not able to erase well and since some students put multiple answers to questions, the recorded data were searched for responses that were not able

to be read by the Scantron machine. Valid responses were corrected in the data set. In the case of multiple responses, the responses were coded as missing.

The data were then analyzed using Minitab-Release 7.2 and SAS-Version 5.18 on the VAX 4000-300 mainframe computer at Winona State University.

Separate files were made for the knowledge assessment posttest and for the attitude survey posttest. Most of the students were the same for both files, but there were some students who completed only one of the two tests due to absences from illness, doctor appointments, special classes, etc. It is important to note that the use of the Solomon four group design leads to consideration of four treatment groups:

Posttest only with No DARE instruction

Posttest only with DARE instruction

Pretest and Posttest with no DARE instruction

Pretest and Posttest with DARE instruction.

In the knowledge assessment posttest (see Appendix A), the percentage of questions answered correctly by each student was calculated for all students answering 20 or more questions. The justification for using percentage of questions rather than raw scores was to make scores comparable for students that had answered different numbers of questions. This was necessary because students had

different numbers of questions with usable answers due to blanks or double answers on the Scantron sheets. The basis for choosing a cut-off of 20 or more was that the remaining students answered 12 questions or less. That is, those not included answered less than one-half of the questions. Frequencies and percentages were calculated for gender (Question 1), ethnicity (Question 2), and parental status (Question 3), as well as the actual knowledge questions (4 to 36) for each treatment group.

In the attitude survey posttest (see Appendix B), the frequencies and relative frequencies were calculated for gender (Question 5) and ethnicity (Question 6), as for all remaining questions for each treatment group. In addition, similar questions were combined to form the following scales: drug knowledge, chemical usage, attitude toward police, self-esteem, resistance, and attitude toward drugs. See Table 2.)

These scales were developed by McCormick and McCormick (1992) using guidelines developed by the St. Paul Police Department. If a student left any of the questions in a scale blank, then that student was omitted from the data analysis for that scale. All of these questions used the Likert method of scoring. The scales were constructed so that the "1" response would indicate "Strongly Disagree" and the "5" response would indicate "Strongly Agree."

Table 2

Scales of the Attitude Survey

Scale	Question Numbers	Number of Students
Drug Knowledge	9-20	462
Chemical Usage	21-29	481
Attitude Toward Police	30-40	447
Self-esteem	41-51	452
Resistance	52-59	459
Attitude Toward Drugs	61-72	442

Since there were not enough children from non-two parent homes, parental status was not used in the statistical analysis. Three-way Analyses of Variance (ANOVA), with the three independent variables being Gender, Presence or Absence of a Pretest, and Exposure or Not to the DARE program, were used as the principle method of hypothesis testing. The dependent variables studied were the percentages on the knowledge assessment posttest and the scores on the six scales from the attitude survey posttest. Because of unequal numbers of students in the various treatment groups and because the number of girls and boys were not equal within each school, the interactions between these three factors were taken into account when doing the analysis. The Type III Sum of Squares in the SAS package

were used, which statistically controls the testing of each source of variation for the effects from all other sources of variation. A significance level of $\alpha = .05$ was used to test each source of variation.

Knowledge Assessment Posttest

The ANOVA Table 3 shows that there was statistical significance for the following sources of variation for the knowledge posttest: gender, exposure or not to the DARE program, and the three-way interaction of gender, presence or absence of a pretest, and exposure or not to the DARE program (G * P * D). (Asterisk indicates an interaction.)

Table 3

ANOVA Table for Knowledge Assessment Posttest

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	74.43	28.01	.0001
Pretest vs No Pretest (P)	1	0.51	0.19	.6618
DARE vs No DARE (D)	1	391.04	147.17	.0001
G * P	1	0.96	0.22	.6355
G * D	1	0.80	0.30	.5828
P * D	1	8.87	3.34	.0683
G * P * D	1	28.70	10.80	.0011
Error	478	1,270.10		

Since the three-way interaction was statistically significant, it must be examined in order to decide which main effects are interpretable. Figure 1 pictorially shows that the three-way interaction is caused by differences between the boys' and girls' mean percentages (calculated as the percent correct for each student) being slightly different for each treatment group.

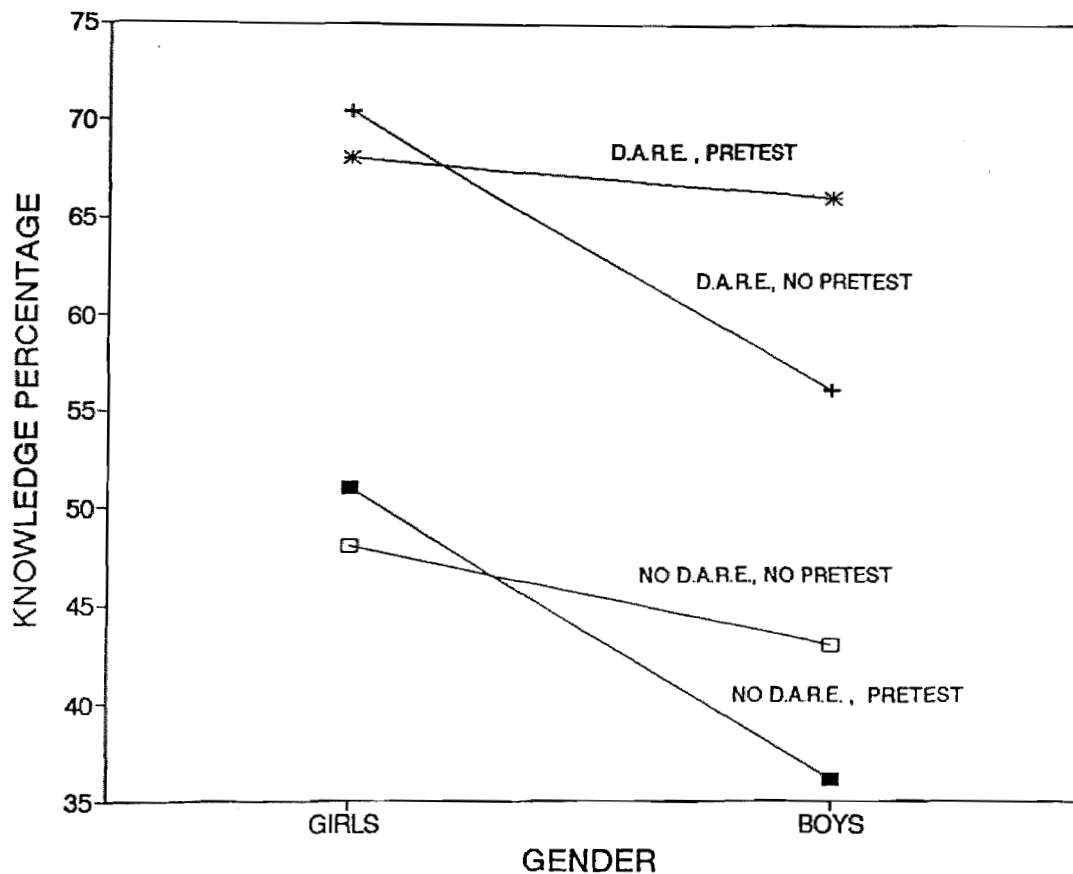


Figure 1. Graph for knowledge posttest interactions of gender by pretesting condition by exposure or not to DARE status means.

The actual means and standard deviations are reported in Table 4. From Table 4 it can be calculated that the difference between girls and boys in the Pretest, No DARE group is 14.58%. For the other three groups the difference between the girls and the boys are 1.65% (Pretest, DARE), 5.10% (No Pretest, No DARE), and 14.32% (No Pretest, DARE). That is, the girls outperform the boys in all four groups. For pretested girls, the difference between the DARE and the No DARE is 17.04%. For non-pretested girls, the difference between the DARE and the NO DARE is 21.96%. For pretested boys, the difference between the DARE and No DARE is 30.03%. For non-pretested boys, the difference between the DARE and No DARE is 12.74%. That is, the groups exposed to the DARE program outperform the groups not exposed to the DARE program.

The statistically significant main effect for gender was caused by girls outperforming boys across all four treatment groups. The statistically significant main effect for exposure or not to DARE was caused by the students who were exposed to DARE outperforming the students not exposed to DARE (see Figure 1). The means and standard deviations broken down by gender and exposure or not to DARE separately are given in Table 5. Table 5 indicates that the girls score 6.51% higher than the boys. Students exposed to DARE scored 19.62% higher than those not exposed to DARE.

Table 4

Table of Means and Standard Deviations for the Knowledge
Posttest Broken Down by Gender and Treatment Group

Treatment Group	n	Mean (%)	Standard Deviation (%)
Girls			
Pretest, No DARE	33	50.83	15.42
Pretest, DARE	55	67.87	17.30
No Pretest, No DARE	124	48.43	13.58
No Pretest, DARE	37	70.39	17.69
Boys			
Pretest, No DARE	31	36.25	15.65
Pretest, DARE	57	66.22	18.13
No Pretest, No DARE	114	43.33	14.78
No Pretest, DARE	35	56.07	23.54

Table 5

Table of Means and Standard Deviations for the Knowledge Posttest Broken Down by Gender and by Exposure or Not to DARE Separately

	n n	Mean (%)	Standard Deviation (%)
Gender			
Girls	249	56.30	18.08
Boys	237	49.79	20.22
Exposure to DARE			
No	304	45.46	14.94
Yes	186	65.08	20.00

Figures 2, 3, and 4 illustrate the distributions of the knowledge percentage scores for those students who were exposed to DARE and those not exposed to DARE. Figures 2 and 3 should be read as follows. The diagram on the left part of each figure is a stem-and-leaf display of the actual knowledge percentage scores rounded to the nearest integer. The vertical column of numbers to the right of the stem-and-leaf display indicates the number of students in each row of the stem-and-leaf display. The boxplot is located on the right hand side of each figure.

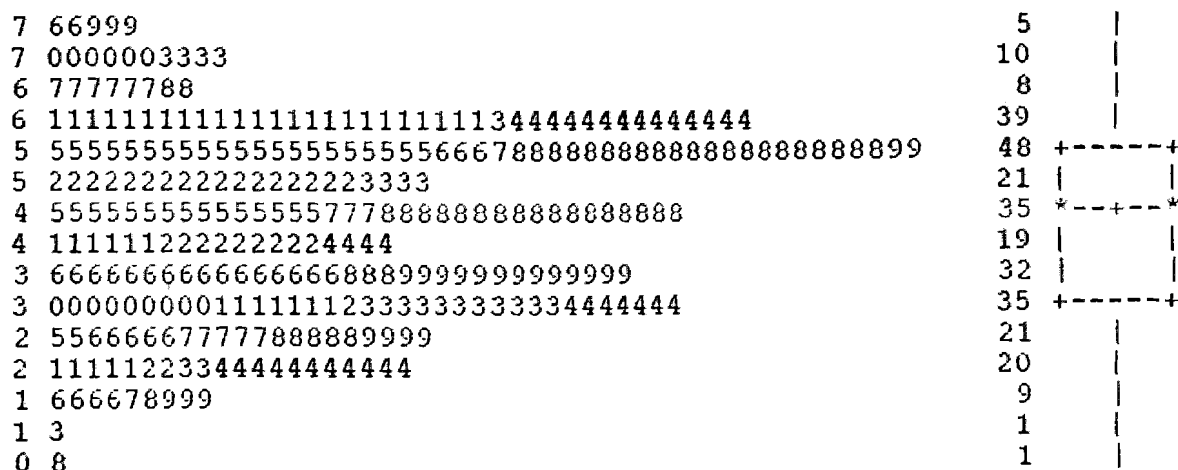


Figure 2. Stem-and-leaf display and boxplot for the knowledge posttest scores for those students not exposed to the DARE program.

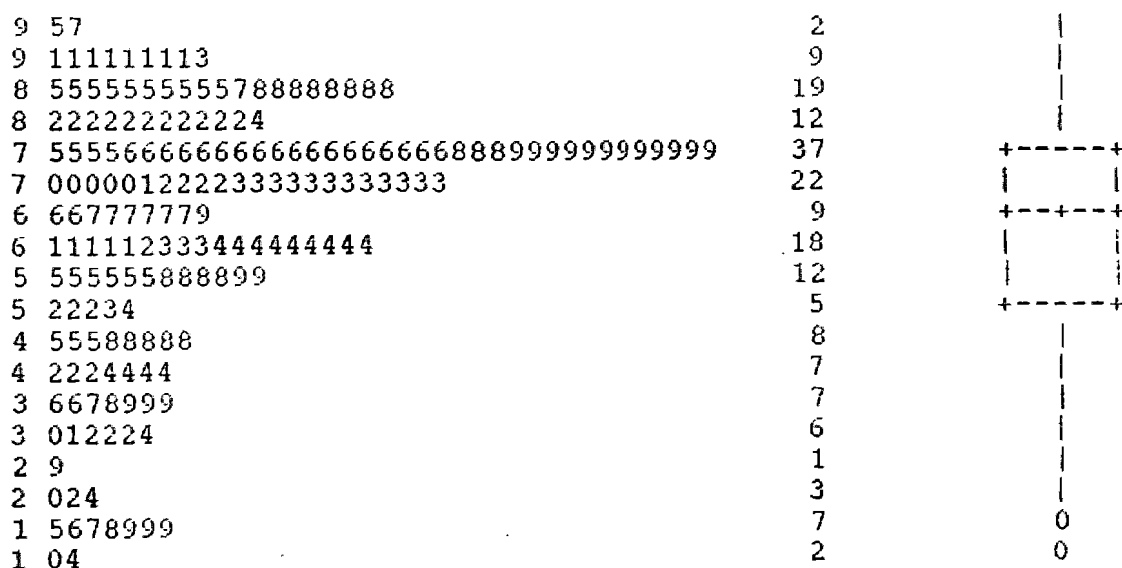


Figure 3. Stem-and-leaf display and boxplot for the knowledge posttest scores for those students exposed to the DARE program.

From the stem-and-leaf displays of the knowledge percentage scores, it can be seen that only 5 students out of 304 (1.64%) of the non-DARE students had scores above 75%, while 79 out of 186 (42.47%) of the DARE students were above 75%. From the boxplots it can be seen that the first quartile (the bottom horizontal line on each boxplot) for the non-DARE students is in the low 30s (actual 33.33), while the first quartile for the DARE students is in the mid 50s (actual 54.30). The medians (the + signs in the boxplots) are in the mid 40s (actual 45.46) for the non-DARE students and in the low 70s (actual 71.88) for the DARE students. The third quartiles (the top horizontal line in each boxplot) are in the high 50s (actual 57.58) for the non-DARE students and in the high 70s (actual 78.79) for the DARE students. This evidence supports the finding of statistical significance in this data.

Figure 4 gives another pictorial illustration of the comparison of DARE percentage scores and non-DARE percentage scores by means of a histogram.

Attitude Survey Posttest

The attitude survey posttest was divided into six scales which includes drug knowledge, chemical usage, attitude toward police, self-esteem, resistance, and attitude toward chemical substances. Results of these six scales will be discussed on an individual basis.

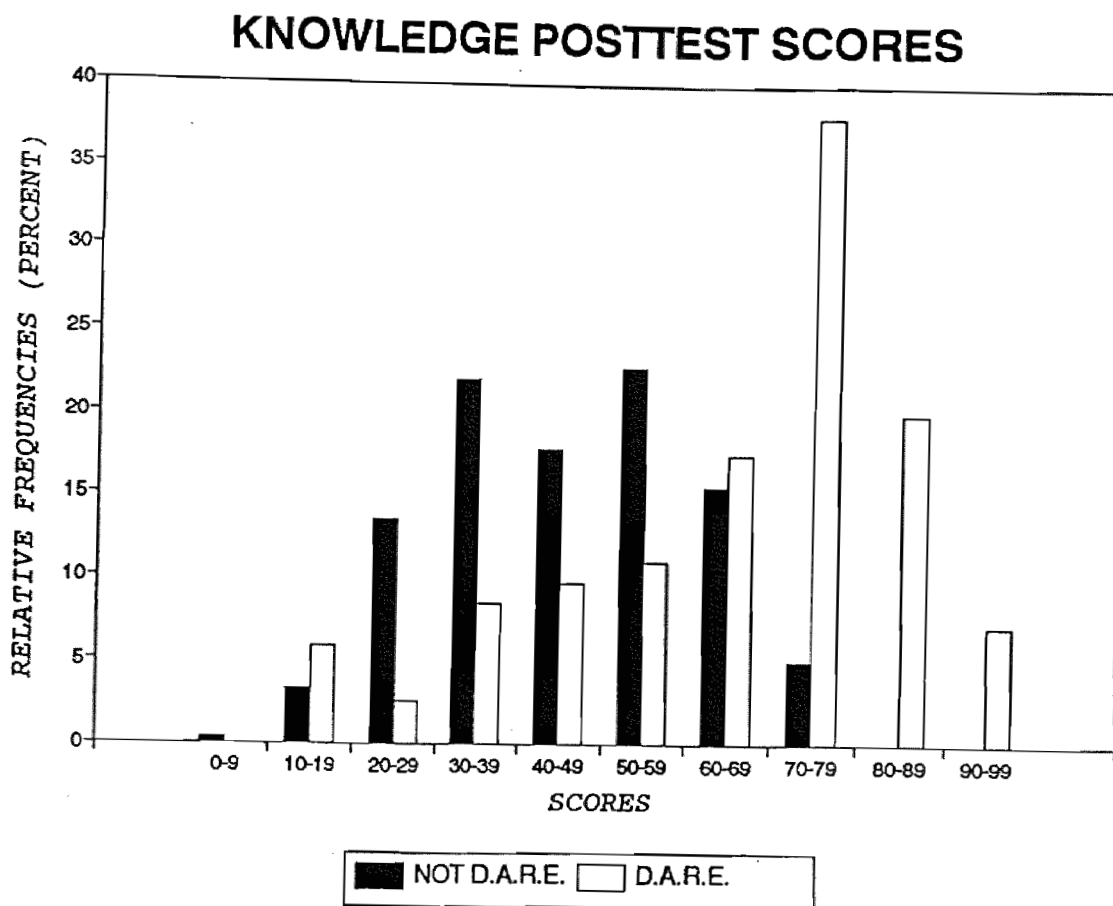


Figure 4. Histogram for knowledge posttest scores comparing DARE percentage scores to non-DARE percentage scores.

Drug Knowledge Scale

The ANOVA Table 6 shows that there was statistical significance for the following sources of variation for the drug knowledge scale: pretesting condition, exposure or not to the DARE program, and the interaction of pretesting condition and exposure or not to the DARE program ($P * D$).

Table 6

ANOVA Table for Drug Knowledge Scale

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	3.59	1.91	.1672
Pretest vs No Pretest (P)	1	7.39	3.94	.0477
DARE vs No DARE (D)	1	90.05	48.00	.0001
G * P	1	0.63	0.34	.6513
G * D	1	3.37	1.80	.0807
P * D	1	20.82	11.10	.0009
G * P * D	1	4.36	2.33	.1280
Error	449	842.38		

Since there was a statistically significant interaction, it must be examined in order to decide which main effects are interpretable. Figure 5 pictorially shows that this interaction is caused by there being a bigger difference between those not exposed to DARE and those exposed to DARE in the groups with the pretest present than in the groups with the pretest absent.

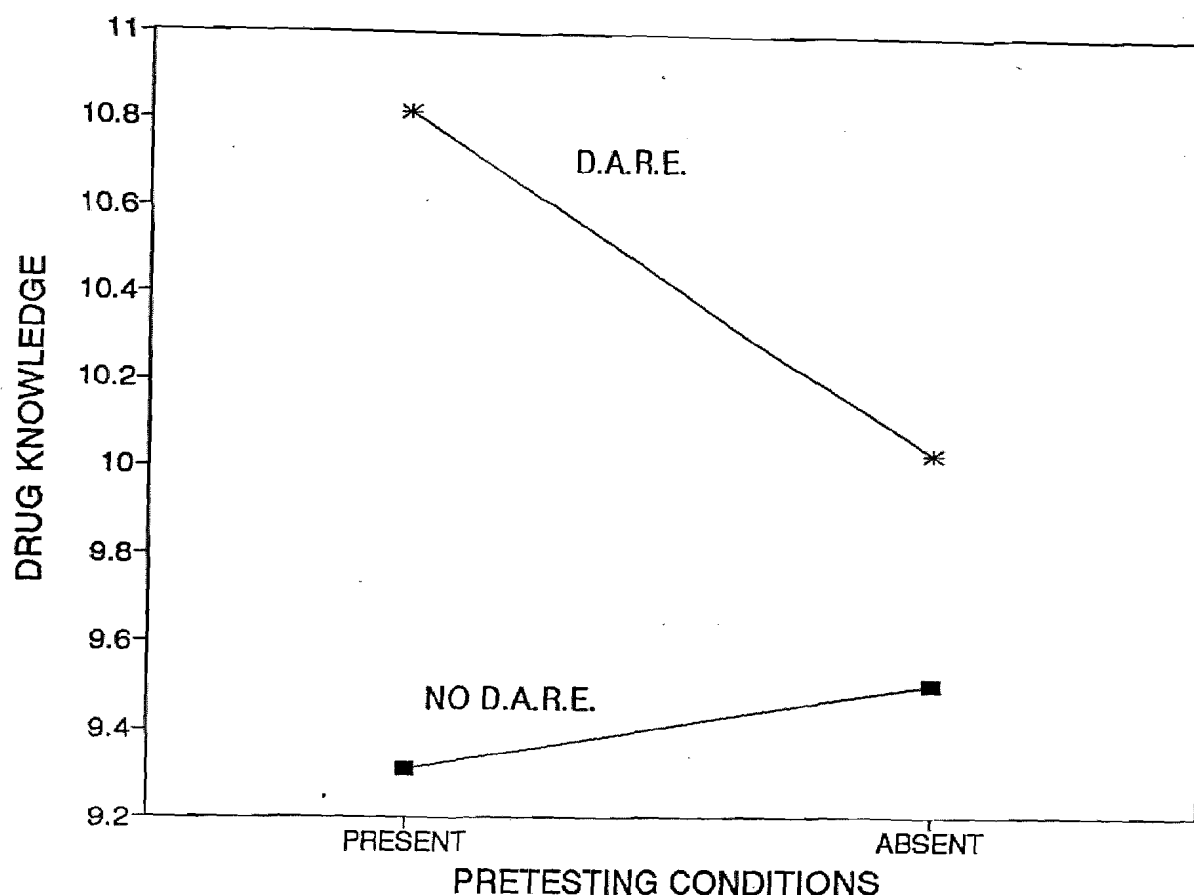


Figure 5. Graph for drug knowledge of pretest conditions by exposure to DARE means.

The actual means and standard deviations are reported in Table 7. Despite these differences, the groups exposed to the DARE program (10.33) outperform the groups not exposed to the DARE program (9.46), but no conclusions can be made about pretesting condition differences on the drug

knowledge scale. Table 7 indicates that for those exposed to DARE, the pretested group (10.82) did better than the non-pretested group (10.03). For those not exposed to DARE, however, the non-pretested group (9.50) did slightly better than the pretested group (9.31).

Table 7

Table of Means and Standard Deviations for the Drug Knowledge Scale Broken Down by Exposure or Not to DARE and Pretesting by Exposure Combinations

Variable	n	Mean	Standard Deviation
Exposure to DARE			
No DARE	290	9.46	1.46
DARE	172	10.53	1.28
Pretest present			
No DARE	61	9.31	1.84
DARE	109	10.82	1.24
Pretest absent			
No DARE	229	9.50	1.34
DARE	63	10.03	1.19

The statistically significant main effect for pretesting condition is not interpretable because it is, as just discussed, confounded with the interaction of

pretesting condition. The statistically significant main effect for exposure or not to DARE was caused by the students who were exposed to DARE outperforming the students not exposed to DARE.

Chemical Usage Scale

The ANOVA Table 8 shows that there was statistical significance for the following sources of variation for the chemical usage scale: presence or absence of a pretest, and the interaction of presence or absence of a pretest and exposure or not to the DARE program ($P * D$).

Table 8

ANOVA Table for Chemical Usage Scale

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	5.29	0.81	.3682
Pretest vs No Pretest (P)	1	58.67	7.77	.0055
Dare vs No Dare (D)	1	6.26	0.96	.3278
G * P	1	1.25	0.19	.6622
G * D	1	8.07	1.24	.2663
P * D	1	125.21	19.20	.0001
G * P * D	1	0.04	0.01	.9365
Error	466	3,038.37		

Since there was a statistically significant interaction, it must be examined in order to decide whether the main effect for pretesting condition is interpretable. Figure 6 pictorially shows that this interaction is caused by those students who were in the pretested group and exposed to DARE having the lowest mean chemical usage.

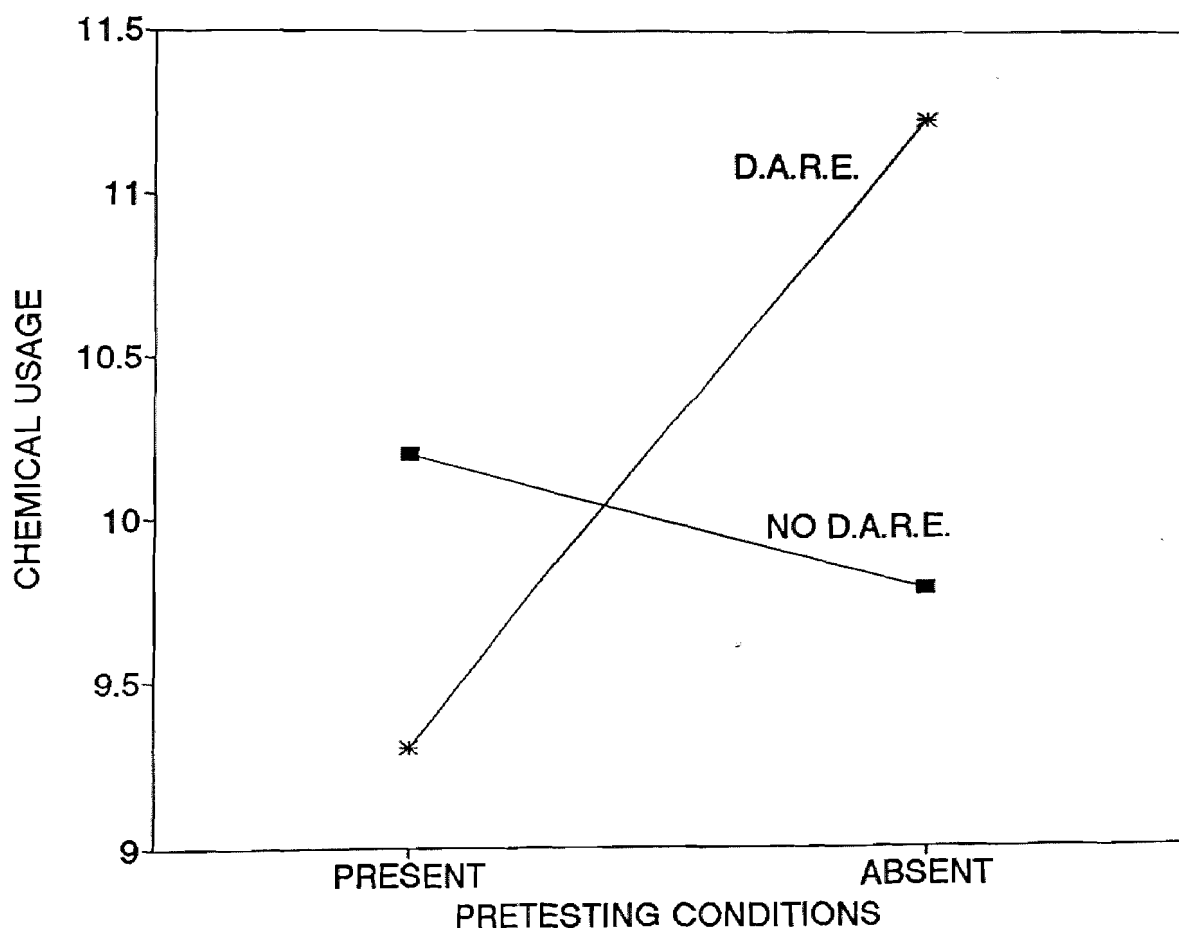


Figure 6. Graph for chemical usage of pretesting condition by exposure to DARE means.

The next lowest mean is the control students with no pretesting and no exposure to DARE. The group with the next mean is those pretested and not exposed to DARE, and the highest mean use is those who were not pretested and exposed to DARE. Because of the disordinal nature of the interaction of pretesting condition and exposure condition, and because of the wide variability of the chemical usage scores in the group that was not pretested and given the DARE program, the main effect for pretesting should not be interpreted. The actual means and standard deviations are reported in Table 9.

Attitude toward Police

The ANOVA Table 10 shows that there was statistical significance for the following sources of variation for the police attitude scale: gender, pretesting condition, interaction of gender and exposure or not to DARE ($G * D$), and interaction of pretesting condition and exposure or not to the DARE program ($P * D$).

Table 9

Table of Means and Standard Deviations for the Chemical Usage Scale Broken Down by Pretesting Condition and by Pretesting by Exposure or Not to DARE Combinations

Variable	n	Mean	Standard Deviation
Pretesting condition			
Present	170	9.64	1.33
Absent	307	10.12	3.08
Pretesting present			
No DARE	65	10.20	1.77
DARE	109	9.30	0.82
Pretesting absent			
No DARE	229	9.50	2.07
DARE	71	11.23	5.04

Table 10

Attitude toward Police

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	265.51	5.00	.0258
Pretest vs No Pretest (P)	1	625.18	11.78	.0007
Dare vs No Dare (D)	1	128.09	2.41	.1210
G * P	1	176.37	3.32	.0690
G * D	1	267.92	5.05	.0251
P* D	1	953.30	17.96	.0001
G * P * D	1	6.51	0.12	.7263
Error	433	22,978.10		

Since there were statistically significant interactions they must be examined in order to decide which main effects are interpretable. Figure 7 pictorially shows the gender by exposure or not to DARE (G * D). From examining this figure it can be seen that within the DARE groups the difference between the mean of the boys and girls is smaller than in the non-DARE groups, but in both DARE and non-DARE groups girls were higher than boys. Further, DARE students scored higher than non-DARE for both girls and boys.

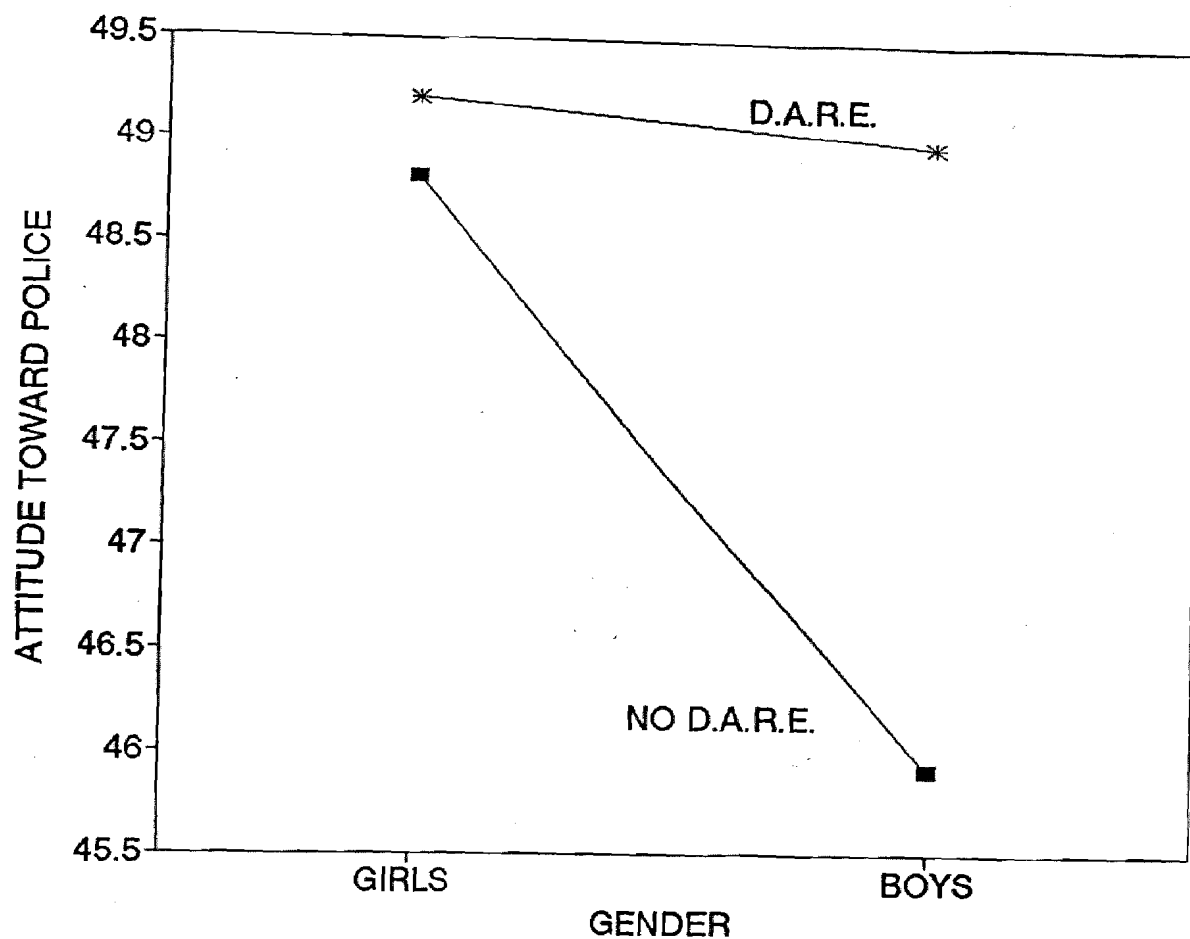


Figure 7. Graph for attitude toward police of gender by DARE exposure means.

Figure 8 gives a pictorial description of the pretesting condition or not to DARE interaction ($P * D$). This pictorial display indicates that in the pretested groups, DARE students do have a better attitude than non-DARE students. In the non-posttested groups, DARE students

have slightly worse attitude toward police than non-DARE students. The actual means and standard deviations are reported in Table 11.

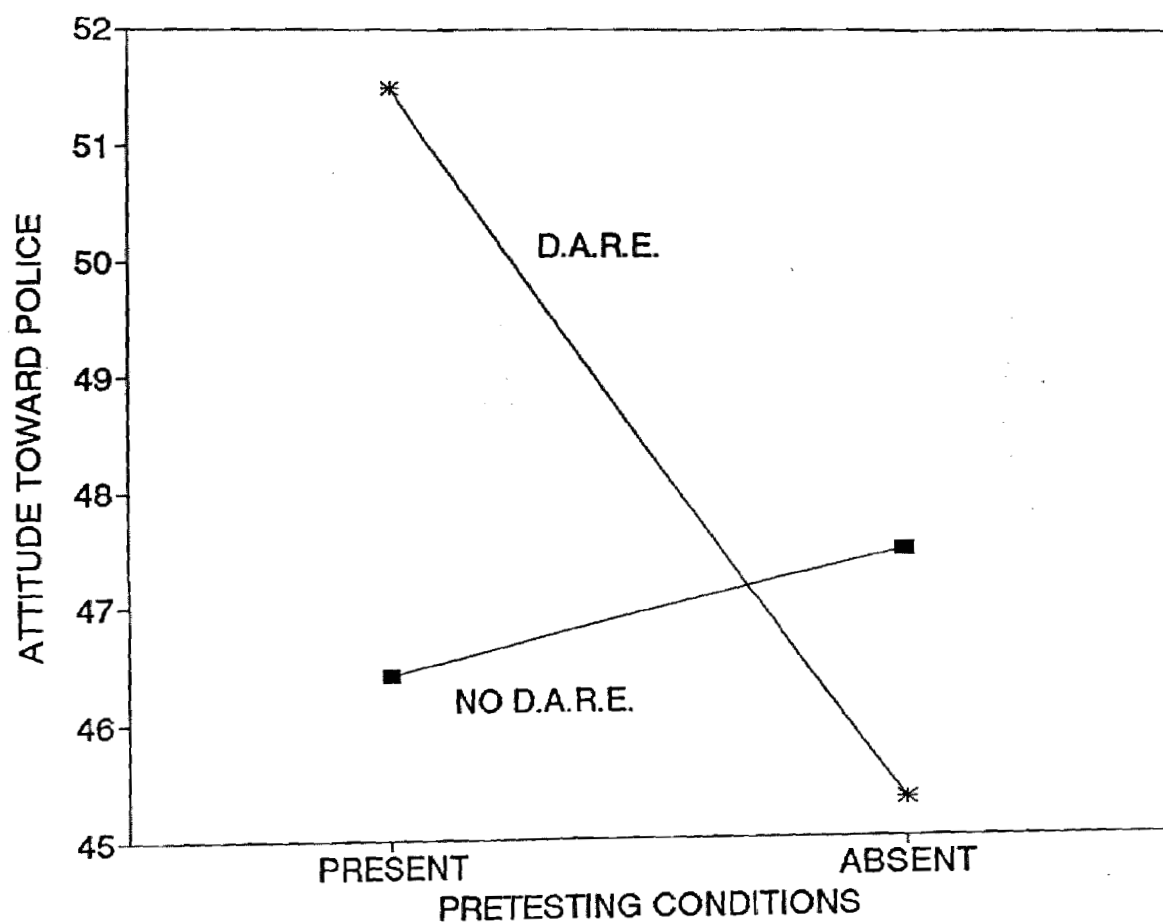


Figure 8. Graph for attitude toward police of exposure or not to DARE and pretesting conditions means.

Table 11

Table of Means and Standard Deviations for Gender,
Pretesting Conditions, Gender by Exposure Combinations, and
Pretesting by Exposure Combinations

Variable	n	Mean	Standard Deviation
Gender			
Girls	213	48.97	6.67
Boys	228	47.06	8.34
Pretesting conditions			
Present	168	49.11	6.98
Absent	279	47.27	7.87
Gender by exposure combinations			
Girls * No DARE	131	48.82	5.95
Girls * DARE	82	49.21	7.71
Boys * No DARE	143	45.91	9.16
Boys * DARE	85	48.99	6.32
Pretesting by exposure combinations			
Pretest * No DARE	53	46.42	8.72
Pretest * DARE	103	51.49	3.98
No Pretest * No DARE	226	47.48	7.67
No Pretest * DARE	65	45.32	8.87

The main effects for pretesting and gender can be investigated. The main effect for gender is caused by girls having higher mean scores than the boys. The main effect for pretesting is caused by the groups that had the pretest outperforming those who did not. It should be noted that this is the only scale for which pretesting had a significant effect.

Self-esteem

The ANOVA Table 12 shows that there was statistical significance for the following source of variation for the self-esteem scale: exposure to DARE or not and pretesting condition by DARE condition interaction ($P * D$).

Table 12

ANOVA Table for Self-esteem Scale

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	32.21	0.52	.4700
Pretest vs No Pretest (P)	1	146.12	2.37	.1243
Dare vs No Dare (D)	1	709.09	11.51	.0008
G * P	1	9.78	0.16	.6905
G * D	1	32.68	0.53	.4668
P * D	1	374.59	6.08	.0141
G * P * D	1	9.28	0.15	.6982
Error	438	26,987.03		

Since there was a statistically significant interaction it must be examined in order to decide whether the main effect for exposure or not to DARE is interpretable. Figure 9 pictorially shows this interaction.

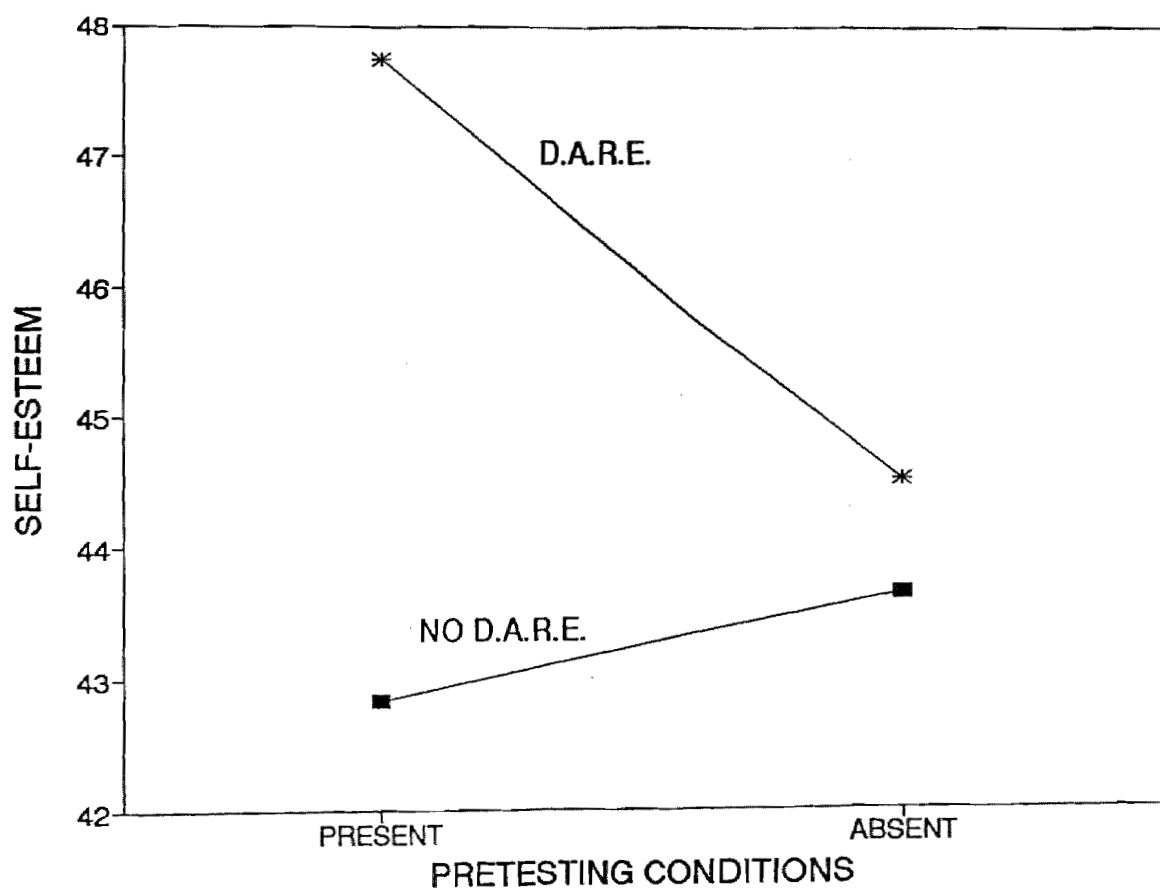


Figure 9. Graph for self-esteem of exposure to DARE or not by pretesting condition means.

The difference in means is much less for non-pretested than pretested students, but DARE students scored greater than non-DARE in both pretest and posttest results. From this, it can be concluded that the main effect for exposure to DARE or not being exposed to DARE is interpretable. That is, those students exposed to DARE (46.52) have higher self-esteem scores than those students not exposed to DARE (43.47). The actual means and standard deviations are given in Table 13.

Table 13

Table of Means and Standard Deviations for the Self-esteem Scale Broken Down by Exposure or Not to DARE and by Pretesting and by Exposure or Not To DARE Combinations

Variable	n	Mean	Standard Deviation
Exposure to DARE			
No DARE	281	43.47	8.29
DARE	171	46.52	7.39
Pretesting by exposure combinations			
P * No DARE	60	42.83	9.42
P * DARE	106	47.74	7.15
No P * No D	221	43.65	7.97
No P * DARE	65	44.52	7.37

Resistance

The ANOVA Table 14 shows that there was statistical significance for the following sources of variation for the resistance scale: gender and gender by exposure to DARE or not condition interaction (G * D).

Table 14

ANOVA Table for Resistance Scale

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	113.27	5.11	.0243
Pretest vs No Pretest (P)	1	53.01	2.39	.1227
Dare vs No Dare (D)	1	45.11	2.04	.1544
G * P	1	8.22	0.37	.5429
G * D	1	87.43	3.95	.0476
P * D	1	19.89	0.90	.3439
G * P * D	1	13.87	0.63	.4293
Error	445	9,862.10		

Since there was a statistically significant interaction, it must be examined in order to decide whether the gender main effect is interpretable.

Figure 10 shows that females are more resistant than males in both DARE and non-DARE conditions. But within the girls the non-DARE students are slightly more resistant than DARE girls, while in boys, DARE students are slightly more resistant. Because of the nature of this interaction, the gender main effect is interpretable. That is, the girls' attitudes towards resistance are better than boys' attitudes. The actual means and standard deviations are given in Table 15.

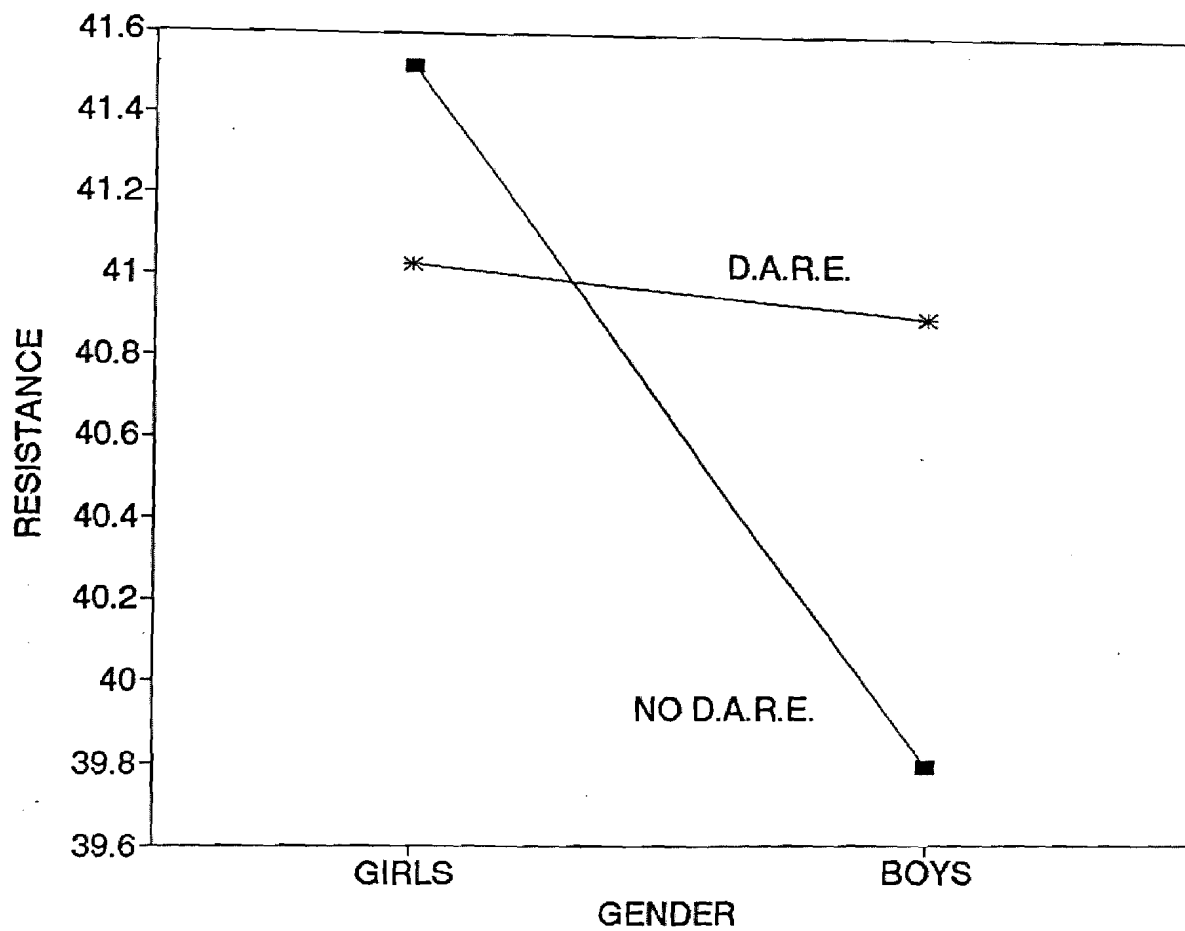


Figure 10. Graph for resistance of gender by exposure or not to DARE means.

Table 15

Table of Means and Standard Deviation for Resistance Broken
Down by Gender, and by Gender by Exposure to DARE

Variable	n	Mean	Standard Deviation
Gender			
Girls	225	41.33	4.09
Boys	228	40.21	5.26
Gender by exposure to DARE			
G * No DARE	139	41.52	3.89
G * DARE	86	41.02	4.39
B * No DARE	141	39.79	5.97
B * DARE	87	40.89	3.77

Attitude toward Drugs

The ANOVA Table 16 shows that there was statistical significance for the following sources of variation for the attitude toward drug scale: gender, exposure or not to DARE, and pretesting by exposure or not to DARE interaction (P * D).

Table 16

ANOVA Table for Attitude toward Drugs

Source of Variation	df	SS	F Value	p-value
Gender (G)	1	586.26	11.28	.0009
Pretest vs No Pretest (P)	1	2.36	0.05	.8315
Dare vs No Dare (D)	1	676.97	13.03	.0003
G * P	1	79.22	1.52	.2177
G * D	1	72.03	1.39	.2397
P * D	1	826.93	15.91	.0001
G * P * D	1	6.02	0.12	.7338
Error	427	22,192.30		

Since there was a statistically significant interaction, it must be examined in order to decide which main effects are interpretable. Figure 11 pictorially shows this interaction.

Table 17 illustrates that the pretest by exposure interaction shows an increase in scores in the pretested groups from the no DARE to the DARE students for the attitude toward drugs scale. In the no pretest condition there is a very slight decrease in scores, from the no DARE to the DARE students.

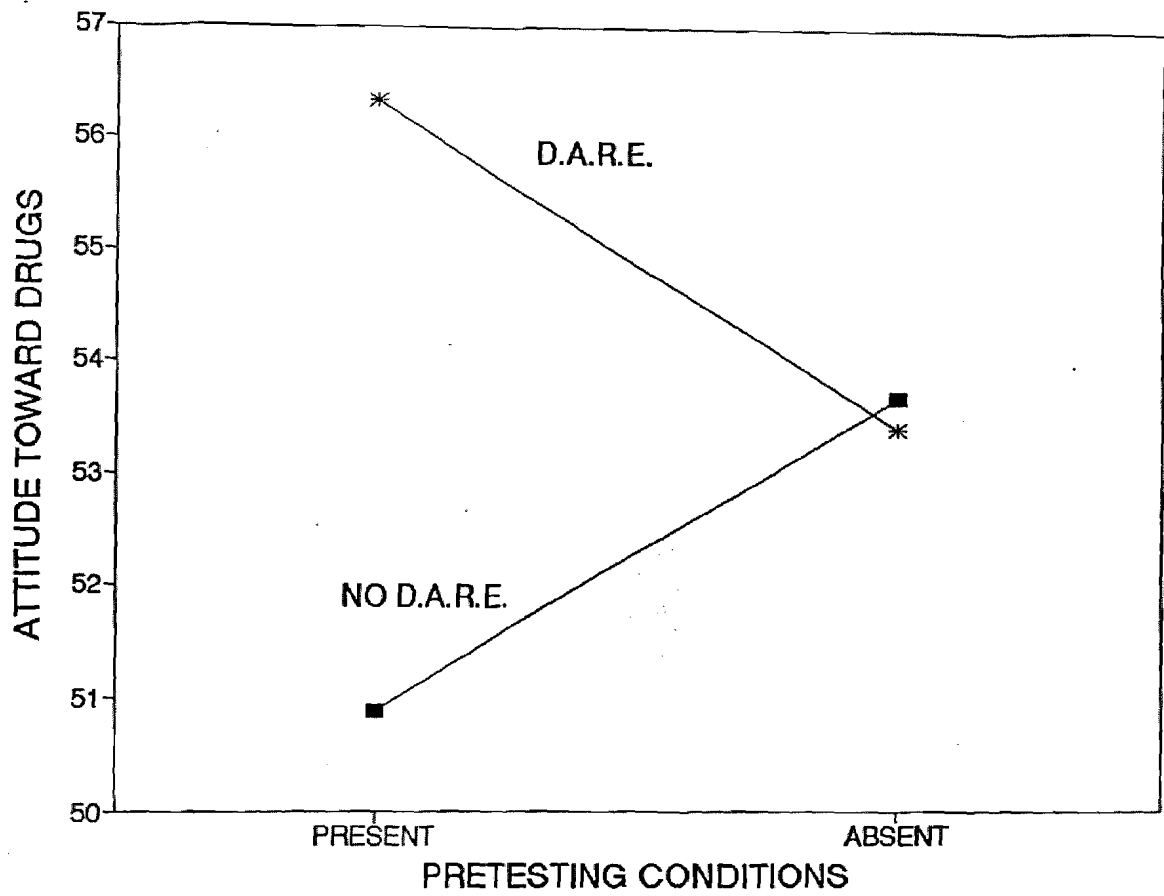


Figure 11. Graph for attitude toward drugs of exposure to DARE or not by pretesting conditions.

Table 17

Table of Means and Standard Deviation for the Attitude toward Drugs Posttest Broken Down by Exposure or Not to DARE, by Gender, and by Pretesting by Exposure or Not to DARE Combinations

Variable	n	Mean	Standard Deviation
Exposure to DARE			
No DARE	274	52.94	8.09
DARE	168	55.20	6.19
Gender			
Girls	215	55.05	6.31
Boys	220	52.60	8.32
Pretesting by exposure combinations			
Pretest * No DARE	57	50.09	9.37
Pretest * DARE	103	56.33	4.95
No Pretest * No DARE	217	53.69	7.56
No Pretest * DARE	65	53.41	7.45

Since there is a very slight decrease in the no-pretest condition from no DARE to DARE, and since there is a pronounced increase in the pretest condition from no DARE to DARE, it can therefore be concluded that exposure to DARE did have a positive effect on attitude toward drugs.

Table 17 also demonstrates that higher scores attained by girls indicated that girls have a better attitude than boys for the attitude toward drug scale.

As an additional way of exploring the effectiveness of the DARE program, t-tests were performed for the group that was pretested and received the DARE program on the differences between the pretest scores and the posttest scores for the knowledge assessment and for the six scales of the attitude survey. For all scores, except the chemical usage scale scores, it was tested whether there was an increase between the pretest and the posttest scores. For the chemical usage scale scores, it was tested whether there was a decrease between the pretest and the posttest, since a decrease in chemical usage is desirable. All of the t-tests were found to be statistically significant. The results of the t-test indicated that the DARE program had a statistically significant effect on the students who were pretested and received the DARE program. The results of the individual t-tests are reported in Table 18. The first line of the table (Knowledge Percent) is for the scores from the knowledge assessment. The second line of the table (Drug Knowledge) is for the drug knowledge scale of the attitude survey.

Table 18

Results of t-tests on Pretest/Posttest Differences

Measure	Pretest Mean	Posttest Mean	Diff.	t	value	n
Knowledge Percent	26.163	66.360	40.200	20.42	.0001	105
Drug Knowledge	10.333	10.835	0.526	3.08	.0014	97
Chemical Usage	10.010	9.301	-0.735	1.80	.0370	102
Attitude to Police	49.057	51.510	2.520	4.09	.0001	98
Self- esteem	45.481	47.620	2.143	3.44	.0004	98
Resistance	40.245	40.971	0.835	1.80	.0380	103
Attitude to Drugs	53.764	56.192	2.465	3.42	.0005	99

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine whether or not differences in drug knowledge and attitude scores existed between students who were exposed to the Project Drug Abuse Resistance Education (DARE) program and students who were not exposed to the Project DARE program.

Specifically, the hypotheses that were tested are listed below:

HO¹: There is no statistically significant difference between the Project DARE treatment and non-treatment posttest knowledge scores.

HO²: There is no statistically significant difference between the Project DARE treatment and non-treatment posttest attitude scores.

In this study, approximately 500 fifth-grade students in eight rural southeastern Minnesota schools were asked to respond to two separate assessment instruments. The assessment instruments consisted of a 36-question knowledge assessment and a 74-question attitude survey. The attitude survey was broken into six subscales to specifically address drug knowledge, chemical use, attitude toward police, self-esteem, resistance, and attitude toward drugs.

A Solomon four group design was used to assess for pretest effects. The knowledge and attitude pretests were administered in September 1992, before the 17-week Project DARE program was taught. A police officer trained in the Project DARE drug prevention education curriculum was the instructor for this program. The posttests were administered during February 1993, after the DARE instruction was completed.

Each testing instrument was scored, as described in Chapter 4, and analyzed using a three-way ANOVA. Group means and standard deviations were computed for each factor (gender [G], pretest condition [P], exposure or not to DARE) [D] as well as for the interactions of these three factors ([G * P], [G * D], [P * D], and [G * D * P]). The alpha level was set at .05 to determine statistical significance.

The analysis of data revealed the following results for the tests of hypotheses.

1. Hypotheses 1 stated there is no statistically significant difference in knowledge scores between DARE and non-DARE students. Tables 4 and 5 illustrate that there were statistically significant differences between mean percentages/scores on the knowledge posttest. This hypotheses was rejected at the .05 level of significance.

2. Hypotheses 2 stated there is no statistically significant difference in attitude scores between DARE and

non-DARE students. Results of this study indicate that significant differences did exist. Students who received the DARE treatment scored significantly higher in the drug knowledge, self-esteem, and attitude toward drugs scales. This hypothesis was rejected at the .05 level of significance for these scales, but could not be rejected for the chemical use, resistance, and attitude toward police scales. In addition, differences due to gender were found for attitude toward police, resistance, and attitude toward drugs in favor of girls over boys. It was found that pretesting had an effect for only the attitude toward police scale.

Further, statistically significant interactions were found. For the pretesting condition by DARE exposure or not interaction, statistical significance was found for the scales of drug knowledge, chemical usage, attitude toward police, self-esteem, and attitude toward drugs. For the gender by exposure to DARE or not interaction, statistical significance was found in the attitude toward police and resistance subscales. t-test results from the group of students that were pretested and exposed to the DARE program demonstrated that there were statistically significant differences between pretest and posttest in the knowledge assessment scores as well as in all six of the scale scores of the attitude survey.

Conclusions

Certain conclusions can be drawn from the results of this study. These conclusions held only for the assessment methods explained in this study and can only apply to those students in the population from which this study was drawn. The results, however, could have implications for students similar to those described in this investigation and for schools that resemble the schools described in this study.

Results of this study indicate:

1. It can be concluded that students who are exposed to the Project DARE program outperform those who are not exposed on the knowledge assessment. Evidence also exists to show that girls outperform boys on this study's knowledge assessment.
2. Pretesting only affected the attitude toward police scale of the attitude survey.
3. Those students exposed to DARE have higher self-esteem scores than those students not exposed to DARE.
4. Girls scored higher on the attitude toward resistance scale than boys.
5. Students exposed to DARE scored higher on the attitude toward drugs scale than students who were not exposed to DARE.

6. t-tests results from the group of students that were both pretested and exposed to the DARE program demonstrated that there were statistically significant differences between pretest and posttest in the knowledge assessment scores as well as in all six of the scale scores of the attitude survey.

The author acknowledges that there may have been many program and environmental factors that couldn't be controlled by the author. Program and environmental factors that may have affected the results include the experience, age, and gender of the police officer who gave the instruction; the climate and attitude of the community toward drug education prevention; the effectiveness of the communication between the school, the parents, the police officer and the community; the instruction of drug prevention education in other settings such as 4-H, Boy Scouts, Girl Scouts, and religious organizations; the involvement of other family members in previous DARE instruction; and the effects of the media including television, movies, books, and magazines.

In summary, the findings of this research support the previous findings of DeJong (1987) that fifth-grade students exposed to DARE did perform better on that investigation's knowledge and self-esteem assessments. It should be noted that the Project DARE drug prevention education program was

not meant to be a stand-alone drug prevention program. It is meant to be used as an upper elementary component of a comprehensive kindergarten through twelfth grade drug prevention education program.

Recommendations/Limitations

The purpose of this study was to determine if students exposed to the DARE program would have significant differences as compared to those not exposed to DARE. The data and results of this study did indicate that students instructed in the Project DARE program did experience a significant positive difference in the knowledge assessment. Students exposed to DARE also experienced significant positive differences on the drug knowledge, attitude toward drugs, and self-esteem scales of the attitude survey. In addition, students who received the DARE treatment and were pretested scored better on the chemical usage and attitude toward police scales than students not exposed to DARE. When only the pretested DARE group scores were examined, it was determined that statistical significance existed between pretest and posttest scores for the knowledge assessment as well as in all six of the scale scores of the attitude survey.

Personal experiences and observations, including administering the knowledge assessment and attitude survey, interviewing adults and students involved in the program,

observing the actual instruction, and participating in the culmination activities have made the author aware of how the Project DARE program does have a positive effect on the attitudes of upper level elementary students.

Based on the data and the results of this study, the review of literature, the author's observations and experiences, and the anecdotal reflections of those people involved with the Project DARE program, the author of this study would recommend to boards of education that they implement the Project DARE program as an upper level elementary component of a comprehensive kindergarten through twelfth grade drug prevention education program.

As a result of the data collected in this study, and the author's personal experiences and observations of those involved in the Project DARE program, the following are suggested as recommendations for improvements to the Project DARE drug prevention education program.

1. The examination of the resistance and attitude toward police scale scores in this study indicate a need for student improvement in these areas. Recommendations for improvement include a reevaluation of the instruction and curriculum in these areas. The reevaluation should address the number of sessions students are exposed to these concepts as well as the instructional strategies, techniques, and modalities that are used for instructional

purposes. The reevaluation should also determine if the instruction and curriculum match the specific learner outcomes desired.

2. Upon review of the statistical data reported in this research study, there exists the possibility of a Type I error. Replicating this study with a different group of students will make it possible to determine if a Type I error did actually occur (Borg & Gall, 1989). Other research options would be to increase the sample size or to lower the significance alpha level to .01 to reduce the likelihood of a similar error (Borg & Gall, 1989).

3. The review of literature indicated that in regards to the DARE program itself evaluation results are, to date, inconclusive. This study utilized a pre-post Solomon four group design. In their study, Ennett et al. (1989), using a pretest/posttest design, identified evaluation immediately following instruction as a limitation of that study. Changes in student behavior as a result of DARE instruction may not appear until some time after a student has completed the program. Therefore, a follow-up and/or longitudinal study is recommended with assessment of student use of chemical substances perhaps three or four years following the initial DARE instruction.

4. In this study, evaluation of the Project DARE program was limited to the comparison of student responses

on a knowledge assessment and an attitude survey. It is recommended that evaluation of the DARE program should not be limited to student response assessments to determine program effectiveness. Evidence of program effectiveness may be indicated by teachers, parents, instructors, and principals using various measures to help determine the effectiveness of the DARE program from various perspectives.

This investigation sought to determine whether differences existed in knowledge assessment scores and in attitude survey scale scores between groups receiving the Project DARE drug prevention program and those not exposed to this program. The study also investigated the other main effects of gender, pretesting conditions, and the interactions of gender by exposure to DARE, gender by pretesting condition, and exposure to DARE by pretesting condition. The results of the study suggest the need for further research concerning the effectiveness of the Project DARE program in order to more fully develop positive student attitudes and resistance skills in regards to chemical usage.

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APPENDIX A

D.A.R.E. KNOWLEDGE ASSESSMENT

1. Are you a girl or boy?
 - A. Girl
 - B. Boy
2. How do you describe yourself?
 - A. American Indian
 - B. Asian/Pacific Islander
 - C. Black
 - D. Hispanic
 - E. White
3. Describe who you live with:
 - A. Two parents
 - B. One parent
 - C. Another relative
 - D. Guardian/Fosterparent
 - E. Other
4. What is the definition of consequences?
 - A. The results of something you do or choose not to do.
 - B. Punishment for not meeting your responsibilities.
 - C. A negative result of something you did.
 - D. The result of not telling the truth.
5. Which of the following will not increase our self-esteem?
 - A. Being complimented
 - B. Helping others
 - C. Performing well on a test
 - D. Having people point out our faults
6. What are the three basic social needs provided by a support system?
 - A. Affection, belonging and recognition
 - B. Love, trust and honesty
 - C. Food, water and shelter
 - D. To be smart, dress well and be liked
7. What type of pressure is exerted by the thoughts and expectations of friends?
 - A. Media
 - B. Peer
 - C. Personal
 - D. Family

8. When alcohol use kills your brain cells they
 - A. will grow back when you quit drinking alcohol.
 - B. will be replace with new and healthy cells after one year.
 - C. will be replaced regardless how much you drink alcohol.
 - D. will never grow back or be replaced.
9. When is it not appropriate to be assertive?
 - A. When turning down a drug offer
 - B. When asked to cheat on a test
 - C. When a parent tells you to do something
 - D. When a friend invites you to drink a beer
10. "Come on, you better drink some beer or I'm not going to be your friend" is an example of what type of pressure?
 - A. Friendly
 - B. Teasing
 - C. Heavy
 - D. Indirect
11. A risk is:
 - A. A possible result
 - B. A consequence
 - C. Making a decision
 - D. Taking a chance
12. What is an alternative?
 - A. Different choices you have in a situation.
 - B. A way of changing one thing into another.
 - C. Anything that alters the way we look at things.
 - D. One choice we have in any situation.
13. The four (4) types of peer pressures are
 - A. Heavy, light, group and easy
 - B. Light, joking, friendly and group
 - C. Friendly, teasing, heavy and tempting
 - D. One person, two person, three person, and four person
14. Which one of the following is not a way to say no to a drug offer?
 - A. Broken record technique
 - B. Pretend to take the drug
 - C. Give a reason or an excuse not to take the drug
 - D. Cold shoulder technique
15. Your self-esteem is
 - A. inherited from your family.
 - B. either be always high or always low.
 - C. is not affected by compliments.
 - D. your responsibility.

16. What is the definition of stress?
- A. Any situation that can cause a person to feel uneasy about what they say and do.
 - B. Worry, nervousness, or concern felt by all of us at one time or another.
 - C. Any strain, pressure or excitement felt about a situation or an event.
 - D. The result of too much activity and responsibility.
17. Consequences are things that happen:
- A. Because of the decisions we make
 - B. Because our friends cause them to happen
 - C. Because of the home we live in
 - D. Because we have no choice
18. The best response style is to use the:
- A. Demanding response style
 - B. Passive response style
 - C. Confident response style
 - D. Unsure response style
19. What is the definition of assertiveness?
- A. A way of telling people what your rights are while still respecting theirs.
 - B. Using what ever way you have to use to protect your rights.
 - C. A way of responding to a person that will make certain they will not take away your rights.
 - D. Loudly telling others your rights.
20. Which of the following is an example of a "reasonable risk"?
- A. Taking a record from a store
 - B. Trying out for the basketball team
 - C. Copying test answers from another student
 - D. Taking someone's bicycle
21. Stressors are situations or events that cause stress. Which of the following is not a stressor?
- A. Moving to a new neighborhood
 - B. Being offered a drug
 - C. Playing in the snow
 - D. Giving a report before the class
22. Who is responsible for the decisions we make?
- A. Peers
 - B. Ourselves
 - C. Families
 - D. Media

23. Why do people make laws and rules?
- A. To allow teachers to punish students
 - B. So police can use them to arrest people
 - C. To help people be better parents
 - D. To protect people and to keep them safe
24. A drug is any substance other than a food that can affect the way your mind or body works. Which of the following is a drug?
- A. Coffee
 - B. Corn
 - C. Bubble gum
 - D. Cotton candy
25. What is the definition of self-esteem?
- A. A favorable way a person feels about himself or herself.
 - B. Being able to get along with other people and hope that others will try to get along with them.
 - C. The ability to make your self feel better even in bad situations.
 - D. A measure of your self worth.
26. Which of the following is not a way to say no?
- A. Walking away
 - B. Yelling at someone
 - C. Avoiding the situation
 - D. Changing the subject
27. A support system:
- A. Is not formed until adulthood
 - B. Remains the same forever
 - C. Is always your peers
 - D. Is people working together to help one another
28. What is the most common type of peer pressure you will encounter?
- A. Friendly
 - B. Teasing
 - C. Heavy
 - D. Indirect
29. A positive consequence of not using drugs is that:
- A. You will lose friends
 - B. You will live a healthier life
 - C. You will get in trouble in school
 - D. You will have more accidents

30. We can manage stress in many ways. One method can be used anywhere and any time to relax. Which one is it?
- A. Doing something to help another person
 - B. Talking to someone
 - C. Exercising
 - D. Deep breathing
31. Which technique would not work well for heavy peer pressure?
- A. Walking away
 - B. Cold shoulder
 - C. Saying "no thanks"
 - D. Strength in numbers
32. In what way can playing games and exercising serve as healthy alternatives to taking drugs?
- A. Playing games and exercising help people to feel good about themselves.
 - B. Exercise helps to relieve emotional feelings resulting from stress, anger and being depressed.
 - C. Exercise can keep your bodies healthy and we can be proud of that.
 - D. All of the above.
33. Advertisers use many ways to pressure people to use their products. Which of the following is not one which is used?
- A. Snob appeal
 - B. Role playing
 - C. Bandwagon
 - D. Comparison
34. Which of the following is an example of a depressant?
- A. Coffee
 - B. Cigarettes
 - C. Alcohol
 - D. Cocaine
35. In forming a support system we look for people:
- A. Who always want to be boss
 - B. Who think the way we do
 - C. Who are selfish
 - D. Who like to fight
36. Giving a reason or excuse is one way to say no. Which of the following is a long term reason or excuse?
- A. No thanks. I am not old enough.
 - B. No thanks. It will make me sick.
 - C. No thanks. I don't want to get lung cancer.
 - D. No thanks. My parents will ground me forever.

APPENDIX B

THE D.A.R.E. PROGRAM STUDENT QUESTIONNAIRE

(pretest)

Instructions: Do not put your name on this questionnaire. The first part of the questionnaire includes 12 sentences with True/False answers. This part of the questionnaire is like a test with right and wrong answers.

The rest of the questionnaire has statements to which you answer "agree" or "disagree." For that part of the questionnaire, the best answer is how you feel. Those statements look like this:

Example:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I like the group "New Kids on the Block" . . .	_____	_____	_____	_____	_____

Do you agree or disagree with this statement?

- If you *agree a lot*, check Strongly Agree.
- If you *agree a little*, check Agree.
- If you *aren't sure*, check Undecided.
- If you *disagree a little*, check Disagree.
- If you *disagree a lot*, check Strongly Disagree.

Please check (X) only one answer for each statement.

You do not have to complete the questionnaire if you don't want to, and you may skip any question if you feel you cannot answer it. No one in school will see your answers, so feel free to be very honest.

Please answer the following:

(1-4) Please write your D.A.R.E. number here.

(5) Are you a girl or a boy?

- _____ 1. Girl
_____ 2. Boy

(6) How do you describe yourself?

- _____ 1. American Indian
_____ 2. Asian or Pacific Islander
_____ 3. Black
_____ 4. Hispanic
_____ 5. White

(7) How well do you do on your school work compared with other boys and girls in your grade?

- _____ 1. I am one of the best.
_____ 2. I do better than most.
_____ 3. I do about average.
_____ 4. I don't do very well.

(8) How do you feel about going to school?

- _____ 1. I like school a lot.
_____ 2. I like school, but not a lot.
_____ 3. I don't like school very much.
_____ 4. I dislike school a lot.

PLEASE GO ON TO THE NEXT PAGE

Please check True or False to sentences 9 through 20.

	True	False
(9) Using drugs regularly can be habit-forming	_____	_____
(10) Drug abuse means the wrong use of a drug or medicine	_____	_____
(11) Sharing drug needles is a common way to get the AIDS virus	_____	_____
(12) Uppers are drugs that make people feel sleepy	_____	_____
(13) Drugs affect the mind but not the body	_____	_____
(14) Smoking marijuana can improve a person's ability to drive a car	_____	_____
(15) PCP can affect a person's ability to feel pain	_____	_____
(16) It is dangerous to ride in a car with a driver who has been drinking alcohol	_____	_____
(17) Downers are drugs that make a person's heart beat faster	_____	_____
(18) Regular snorting of cocaine seldom causes any physical damage to a person	_____	_____
(19) It is perfectly safe to take medicine that a doctor has given to someone else	_____	_____
(20) A person can easily overdose by using downers along with alcohol ..	_____	_____

IN THE PAST YEAR, how many times have YOU done each of the following things?
Put a check under the column that tells how many times you have done each one.

	Never	Less Than Once A Month	About Once A Month	About Once A Week	About Once A Day
(21) Used tobacco (smoked cigarettes, chewed tobacco) ..	_____	_____	_____	_____	_____
(22) Drunk beer/wine/wine coolers ..	_____	_____	_____	_____	_____
(23) Drunk hard liquor (whiskey, gin, vodka, etc.)	_____	_____	_____	_____	_____
(24) Used inhalants (sniffed glue, paint, butane, etc.)	_____	_____	_____	_____	_____
(25) Used laxatives	_____	_____	_____	_____	_____
(26) Used uppers (diet pills, speed)	_____	_____	_____	_____	_____
(27) Smoked marijuana	_____	_____	_____	_____	_____
(28) Used cocaine/crack	_____	_____	_____	_____	_____
(29) Used other hard drugs	_____	_____	_____	_____	_____

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Please check how strongly you agree or disagree with each of the following statements.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(30) I have a lot of respect for the police ...	_____	_____	_____	_____	_____
(31) Most police officers are pretty nice people	_____	_____	_____	_____	_____
(32) Most police officers like to pick on kids	_____	_____	_____	_____	_____
(33) Police officers like to scare kids	_____	_____	_____	_____	_____
(34) Police officers like to push people around	_____	_____	_____	_____	_____
(35) Police really care about kids my age ...	_____	_____	_____	_____	_____
(36) We can learn from police officers	_____	_____	_____	_____	_____
(37) Police officers are there to help us ...	_____	_____	_____	_____	_____
(38) Police officers like to hassle kids for no reason at all	_____	_____	_____	_____	_____
(39) Police officers would rather catch you doing something wrong than try to help you	_____	_____	_____	_____	_____
(40) Police officers do good things in my community	_____	_____	_____	_____	_____
(41) I am able to do things as well as most kids my age	_____	_____	_____	_____	_____
(42) I think that I am very special	_____	_____	_____	_____	_____
(43) I often wish that I were someone else .	_____	_____	_____	_____	_____
(44) I often feel that I can't do anything right	_____	_____	_____	_____	_____
(45) I usually feel good about myself	_____	_____	_____	_____	_____
(46) On the whole, I am satisfied with myself	_____	_____	_____	_____	_____
(47) I don't like myself very much	_____	_____	_____	_____	_____
(48) Sometimes I feel that my life is not very useful	_____	_____	_____	_____	_____
(49) Sometimes I think that I am no good ...	_____	_____	_____	_____	_____
(50) I usually feel proud of myself	_____	_____	_____	_____	_____
(51) I am an important member of my family	_____	_____	_____	_____	_____

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Please check how strongly you agree or disagree with each of the following statements.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(52) If someone pressures me to use drugs I should say "no thanks" and walk away	_____	_____	_____	_____	_____
(53) The best way to say "no" to drugs is to stay away from people who use them	_____	_____	_____	_____	_____
(54) Real friends don't push kids into trying drugs or alcohol	_____	_____	_____	_____	_____
(55) If your best friend offers you a drug you have to take it	_____	_____	_____	_____	_____
(56) I would drink beer if my friends did, even if I didn't want to	_____	_____	_____	_____	_____
(57) If you attend a party where everyone else is drinking alcohol, you can have a good time without joining in ..	_____	_____	_____	_____	_____
(58) If drugs are pushed on me I can say "no thanks, they make me throw-up" ..	_____	_____	_____	_____	_____
(59) I should walk away from those who try to make me use drugs	_____	_____	_____	_____	_____
(60) A true friend would never ask you to eat or drink something that wasn't really safe	_____	_____	_____	_____	_____
(61) It's okay for kids to use alcohol if they don't get drunk	_____	_____	_____	_____	_____
(62) Using drugs is okay as long as you don't use them a lot	_____	_____	_____	_____	_____
(63) Alcohol is a reward for hard work	_____	_____	_____	_____	_____
(64) If you are under stress, drinking alcohol won't really help	_____	_____	_____	_____	_____
(65) Using street drugs is wrong, no matter how little you use them	_____	_____	_____	_____	_____
(66) It's okay to sell drugs if you don't use them	_____	_____	_____	_____	_____
(67) It's okay for kids to try marijuana, just to satisfy their curiosity	_____	_____	_____	_____	_____

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Please check how strongly you agree or disagree with each of the following statements.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
(68) Sometimes the only way to keep from feeling sad is to get "high"	_____	_____	_____	_____	_____
(69) Kids should not use alcohol at all	_____	_____	_____	_____	_____
(70) Drugs make you look cool in front of your friends	_____	_____	_____	_____	_____
(71) Kids who drink alcohol are more grown up than those who don't	_____	_____	_____	_____	_____
(72) It is okay to drink a little beer	_____	_____	_____	_____	_____

(73) I know who I can get drugs from if I want them.

_____ 1. Yes _____ 2. No

(74) How much do you think you will learn from the D.A.R.E. Program?

_____ 1. I think I will learn a lot. _____ 3. I think I will learn a little.
_____ 2. I think I will learn some. _____ 4. I don't know.

END